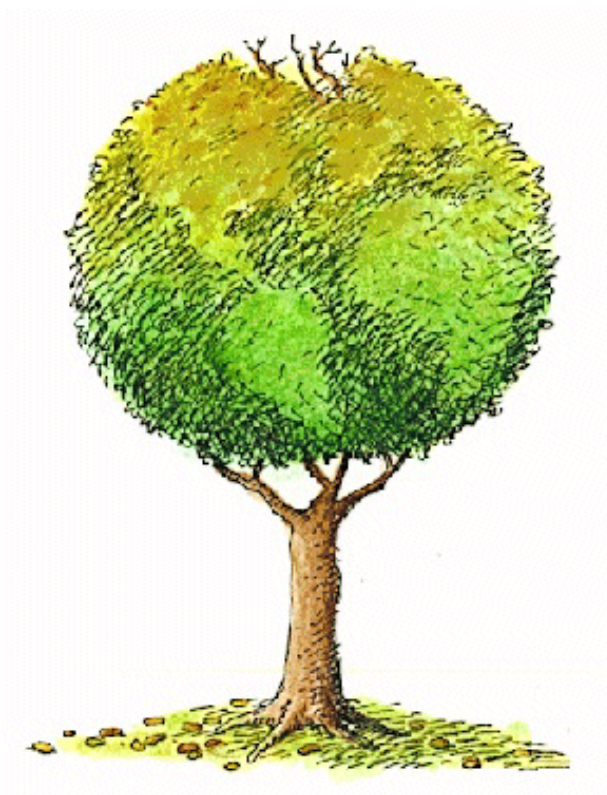


Going Green in Brooklyn

An Integrated Unit of Study for 2nd Grade



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Standards

The North American Association For Environmental Education (NAAEE) Standards

- Guideline 1.1— Focus on nature and the environment
- Guideline 1.3—Culturally appropriate Goals, objectives, and practices
- Guideline 1.4—Environmental literacy
- Guideline 2.2—Authentic experiences
- Guideline 2.3—Child-directed and inquiry-based
- Guideline 3.1—Use of the natural world and natural materials
- Guideline 4.3—Development of environmental understandings
- Guideline 4.4—Skills for understanding the environment
- Guideline 4.5—A personal sense of responsibility and caring
- Guideline 5.6—Environmental sustainability
- Guideline 6.6—Planning and implementing environmental education

Common Core Math Standards:

- 2.OA.1. Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.¹
- 2.NBT.5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- 2.NBT.6. Add up to four two-digit numbers using strategies based on place value and properties of operations.
- 2.NBT.7. Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
- 2.NBT.8. Mentally add 10 or 100 to a given number 100–900, and mentally

subtract 10 or 100 from a given number 100–900.

2.NBT.9. Explain why addition and subtraction strategies work, using place value and the properties of operations. Reading: Literature

RL.2.1. Ask and answer such questions as *who*, *what*, *where*, *when*, *why*, and *how* to demonstrate understanding of key details in a text.

RL.2.2. Recount stories, including fables and folktales from diverse cultures, and determine their central message, lesson, or moral.

RL.2.3. Describe how characters in a story respond to major events and challenges.

RL.2.7. Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot.

2.MD.5. Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

Common Core Reading Informational Texts:

RI.2.1. Ask and answer such questions as *who*, *what*, *where*, *when*, *why*, and *how* to demonstrate understanding of key details in a text.

RI.2.4. Determine the meaning of words and phrases in a text relevant to a *grade 2 topic or subject area*.

RI.2.5. Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.

RI.2.6. Identify the main purpose of a text, including what the author wants to answer, explain, or describe.

Common Core Writing:

W.2.1. Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., *because*, *and*, *also*) to connect opinion and reasons, and provide a concluding statement or section.

W.2.2. Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.

W.2.6. With guidance and support from adults,

W.2.7. Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).

W.2.8. Recall information from experiences or gather information from provided sources to answer a question. use a variety of digital tools to produce and publish writing, including in collaboration with peers.

Common Core Speaking and Listening:

SL.2.5. Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.

NYC Science Scope and Sequence:

Unit 3

Describe the basic needs of plants: Light, air, water, soil (nutrients) LE 1.1b

Observe that plants respond to changes in their environment (e.g., the leaves of some green plants change position as the direction of light changes; the parts of some plants undergo seasonal changes that enable the plant to grow, seeds to germinate, and leaves to form and grow). LE 5.2a

Unit 1

Make clear that nonliving things can be human-created or naturally occurring. LE 1.1dLE 1.1d

NYC Scope and Sequence Social Studies Standards:

Thematic Strands

I Culture – A people’s way of life, language, customs, arts, belief systems, traditions, and how they evolve over time.

II Time, Continuity, and Change – The importance of understanding the past and key historical concepts, analytically and from various perspectives.

III People, Places, and Environments – The complex relationship between human beings and the environments within which they live and work.

VII Production, Distribution, and Consumption – The role of resources, their

production and use, technology, and trade on economic systems.

VIII Science, Technology, and Society – The significance of scientific discovery and technological change on people, the environment, and other systems.

IX Global Connections – The critical importance of knowledge and awareness of politics, economics, geography, and culture on a global scale.

X Civic Ideals and Practices – The understanding that civic ideals and participatory citizenship are central to democracy.

Unit 2: NYC Over Time

New York City has a rich and diverse cultural heritage 1.2b, 1.4b

New York City has many cultural institutions (museums, historical societies, libraries and schools) 4.1f

New York City has changed over time and will continue to change in the future
1.1 1.2 1.4

Physical environment 3.1d, 3.1e

Use of natural resources 3.1a, 4.1d

Jobs and industry 3.1a, 4.1c, 4.1e

Technological advances 1.3b

Technological advances 1.3b

Unit 1: Our Community's Geography

New York City residents are influenced by the geography (travel, jobs, architecture, etc.) 3.2a

Unit 3: Urban, Suburban and Rural Communities

Environmental factors influence the life-styles of community residents (schools, buildings, sports and recreation facilities, extreme weather preparation) 3.1a, 3.1e, 3.2a

Unit 4: Rights, Rules and Responsibilities

People need rules for the use of community resources 5.1c

Community resources provide public services (library, hospital, playground, etc.)
3.1a, 4.1a, 4.1c, 4.1f

Community resources require community workers (fire-fighters, police officers,
sanitation workers, teachers, etc.) 3.1a, 4.1a, 4.1c, 4.1f

Essential Questions:

Why do we need to engage in sustainable living practices?

How will sustainable practices make a difference in our environment and community?

How can we be more environmentally friendly in our day-to-day life?

What careers and establishments impact the ways in which people in Brooklyn live in relation to their environment?

Enduring Understandings:

We need to consider the environmental impacts of our actions or risk permanently damaging our community.

Brooklyn as a community engages in environmentally friendly practices to contribute to a more sustainable way of life.

Students and other members of society can adopt small changes that will have a great impact on the community and environment.

MATH

Measuring CO2 Emissions
How much do we throw
away (weight)?
How much does it cost...
Water Used By Class

ARTS

Band Aid Drawing (Judy
Moody)
Acting Out Problem Solving:
What if Someone Doesn't
Want to Recycle?
Solar Panel Field Trip
Follow-up
Community Gardens

SCIENCE

How Long To Decompose?
Global Warming
Solar Energy
Wind Power
Saving Water
Negative effects of littering, waste, CO2
emissions

FIELD TRIPS

Brooklyn Children's
Museum
Wastewater Treatment
Plant
East NY Farms
Subway Solar Panels
Brooklyn Navy Yard Wind
Turbine

LITERATURE/READING

Book Clubs
Read Alouds
Saving Water
Cultural Environmental
Practices
Wind Energy
Community Gardens

Going Green in Brooklyn

WRITING

Writing Journal: How I Am
Helping My Family Go Green
Persuasive Letters
Judy Moody Journals
Tweets
Community Gardens
PSAs
Subway Solar Panels
Wind Energy
Brooklyn Navy Yard

SOCIAL STUDIES

Growing Green-Community
Gardens and Locally Produced
Food
Trash Worker, treatment Worker,
Environmental interviews
Local Environmental Problems
Cultural Environmental Practices
East New York Farms

SOCIAL ACTION

Implement Class/School
Recycling Program and
Raise Awareness
Write to Community
Restaurants to Convince
them to Go Green
Tweets
PSAs

Technology

Environmental
Tweets
Public Service
Announcement
Wind Turbines
Community
Gardens
Carbon Footprint

Lesson	Lesson 1: Local Environmental Problems	Lesson 2: Book Clubs	Lesson 3: Negative Effects of Littering, Waste, and CO2 Emissions
Description	In this lesson students will begin activating their prior knowledge on what environmental issues they know about within their community. Students will think about the things they (and their families/community members) do to preserve the environment of their community and move towards sustainability. We will create a class KWL chart to get students thinking about the unit themes. At this time the class will also create a Twitter account for this unit of study. Throughout the unit students will work as a class to “tweet” daily to an audience of friends, family, and community members and the things they are learning.	Students will select non-fiction books from the school or local library to focus on throughout the unit. Groups will meet bi-weekly throughout the unit to set reading goals and discuss the environmental issues raised in the books in connection to their class work on this unit of study. In book groups students will practice visual note taking to begin synthesizing and sharing information in a multi-sensory way. Students in each book group will present their findings to the class on a weekly basis and each group will compose a weekly “tweet” to post on the class Twitter page	This lesson is a class read aloud and a class discussion on the themes of Littering, Waste, and CO2 Emissions. Students will then work in groups to create chart paper sized posters on these topics using the visual note taking skills they practiced in Lesson 2. These posters can be shared with other members of the school community to help promote the social activism the students will take later in the unit
Materials	Chart paper, markers	http://www.core77.com/blog/sketchnotes/sketchnotes_101_the_basics_of_visual_note-taking_19678.asp , Student selected non-fiction books on various environmental topics, Notebooks, Markers, Pens, Pencils	Let's Talk Trash: The Kid's Book About Recycling, chart paper, markers
Differentiation	Students can have a partner be their “voice” and help share their ideas, students can add illustration to their KWL chart.	Students will use a combination of visuals and words to express their ideas and reflections. They may also use assistive technology to record these ideas	Copies of the text can be translated to other languages to help ELL students, students may use assistive technology to help create their posters
Assessment	Students will be assessed off of participation in the development of the KWL chart and on their ability to be active listeners	Students will be assessed based off of their book club notes and class presentations	Students will be assessed based on class discussion and the informational posters they create
Integrated Content Areas	Literacy, Art	Literacy, Technology, Art	Literacy, Science, Art, Social Activism

Lesson	Lesson 4: Measuring CO2 Emissions	Lesson 5: Measuring Global Warming	Lesson 6: How Much do We Throw Away?
Description	Students will use www.myfootprint.org to calculate their “carbon footprints” or the ecological impact that their day-to-day actions have on the environment. This activity will be done on a paper copy with parent support at home so students have access to the data asked for. This will then be entered into the computer system at school. After the calculations students will reflect on ways that they can and can not feasibly lessen their carbon footprint.	Students will research temperature and water level data for the community and graph the ways in which global warming had impacted their environment over the past century. Students will practice drawing bar and line graphs to represent their data. They will focus on labeling their graphs with informative labels to convey their data.	Students will carry around a trash bag for a day and add to it with the things they would typically throw away. They will then do a written reflection on the experience of physically carrying their waste. Students will also weigh and chart the classroom waste and recycling on a daily basis and document any changes in either throughout the unit.
Materials	www.myfootprint.com , homework page of information required, computer Differentiation: Students who cannot access home information or may not have a specific home may use information based on averages for their community, students will work in heterogenous partnerships to use the web program	Computer, graph paper, pencils	Trash bags, journals, scale, trash bin, recycling bin, class journal, graph paper
Differentiation	Students who cannot access home information or may not have a specific home may use information based on averages for their community, students will work in heterogenous partnerships to use the web program	Teacher can provide data for students to analyze instead of having students collect their own data, heterogenous groupings	Students can take on different roles in this project, assistive technology and visual integration to support reflection
Assessment	Students will be assessed on their active reflection in the group discussion and appropriate use of the carbon footprint calculator	Students will be assessed based on their graphs and their oral reflections	Students will be assessed on written reflection, discussion, measurement, and their work on the class line graph
Integrated Content Areas	Technology, Science, Math	Math, Science, Technology	Math, Science, Literacy

Lesson	Lesson 7: Cultural Environmental Practices	Lesson 8: How Long Does it Take to Decompose?	Lesson 9: Interviews
Description	Students will talk to family and community members and read self-selected books and articles about historical and current environmental practices in relation to culture and cultural practices. Students will reflect in their journals on how environmentalism is not a new focus and how different cultures and peoples have practiced environmentally aware behaviors for a long time.	Students will learn about the different amounts of time it takes for different types of materials to decompose in a landfill or environment. They will graph these amounts on a bar graph to compare different materials. They will also look at data about what materials are most used in the products prevalent in their community. From this information students will draw conclusions about what types of products contribute most to a sustainable lifestyle.	Students will interview family or community members about the ways in which they contribute to a more sustainable planet. They will then bring these ideas to class and engage in a peer discussion about these things. Students may also interview waste-workers such as garbage and recycling workers to find out more about the types and quantities of waste they work with.
Materials	Books on cultural environmental practices, journals, paper	Information on the time it takes different materials to decompose, chart paper, pencils	Interviewees, Journals, Pencils
Differentiation	Students may have articles and books read aloud to them or explore via youtube and other videos, students may also read in partnerships to support comprehension	Students can be placed in partnerships to support their graphing ability, for struggling students the teacher could lead a small group in this activity	Teacher can provide students with contacts whom they can interview in class or over the phone/ by skype, students may record or write about their interview
Assessment	Students will be assessed based on their written reflection	Students will be assessed on the graphs they create and the conclusions they draw during class discussion	Students will be assessed on the information they share from their interview experience(s)
Integrated Content Areas	Literacy, Social Studies, Science	Science, Math, Literacy	Social Studies, Science, Technology

Lesson	Lesson 10: Judy Moody	Lesson 11: Brooklyn Children's Museum	Lesson 12: Solar Energy
Description	Judy Moody Saves The World read aloud- chapter a day. 1st activity- band aid lesson, 2nd activity- vocabulary webs, 3rd activity- conflict and resolution lesson, 4th activity- journal writing and 5th activity- final book project collage from recycled materials. The vocabulary lesson will use a web diagram to help the students learn recycling vocabulary. The conflict and resolution lesson will use flow charts to outline the conflicts and resolutions Judy Moody solves in the story. The journal writing will have the students assume a character role. The final collage will have a written component explaining what each part represents.	At the Brooklyn Children's Museum, a museum educator will lead a workshop in the beginning to introduce the students to the museum. Then the students will complete a scavenger hunt to find the recycled materials used in their exhibits (vinyl records as roofing, cork as sand in the sandbox, recycled bottles as the boardwalk, and sunflower seeds as walling). After the students complete the scavenger hunt and have a discussion with the teacher as a class, the students will be able to freely explore the museum.	This lesson will begin with a hands-on lesson about conductors and insulators and creating a circuit. Students will learn that a circuit must be completed in order for energy to flow through. Conductors must be used in this circuit to allow electricity to flow. We will use batteries, light bulbs, alligator clips and a variety of materials to use as conductors and insulators. Students will create the circuits and record which materials work best. After this lesson we will study how a solar cell is set up and how it resembles our battery circuit. This will lead to a discussion about which circuit is more "green" and creates less waste.
Materials	Judy Moody Saves The World by Megan McDonald, band aid paper (blank band aid drawn on full size paper), vocabulary web, flow charts, student journals, materials to use in a collage	Field trip scavenger hunt handout, tickets to the Brooklyn Children's Museum	SmartBoard, document projector, Alligator clips, light bulbs, light bulb sockets, batteries, conductors and insulators (coins, fabric, cans, erasers ect), power point presentation for Smartboard, conductors and insulators worksheet, solar circuit worksheet
Differentiation	1st lesson- some students will be required to write a description of their bandaids, while others are not. 2nd- vocabulary webs will be differentiated for three levels. 3rd- certain groups will be asked to complete fewer or more flow charts. 4th/5th- writing expectations are different depending on student.	Teacher will collect the scavenger hunt worksheets and see if the students understood how the museum reused materials and currently recycles	Activity will be done in partners that will be heterogeneous and the solar circuit worksheet will be differentiated
Assessment	1st lesson- bandaids, 2nd lesson- vocabulary webs, 3rd lesson- flow charts, 4th lesson- journals, 5th lesson- collages. Students will be informally assessed through matrices during discussion.	Students will be heterogeneously grouped in partners for scavenger hunt at museum	All completed worksheets will be collected to assess understanding and discussions will also be used as informal assessments
Integrated Content Areas	Literacy, Writing, Arts	Field Trip	Science, Writing

Lesson	Lesson 13: Subway Solar Panels	Lesson 14: Wind Energy	Lesson 15: Brooklyn Navy Yard Wind Turbine
Description	After studying how solar panels work, the class will take a trip to the Coney Island Stillwell Avenue station to look at the solar panels on the roof. The teacher will lead the students around the site to make observations about where the panels are located, how much sun they are getting, if there are any obstructions blocking the panels from the sun and even interview some patrons to see if they noticed the panels. Students will take photographs of the building and solar panels to look at back in the classroom. Upon returning to the classroom the students will draw their own building with solar panels. The students will also write a few sentences about why they placed and organized their solar panels as they did.	Students will look at diagrams of wind turbines on the Smartboard and dissect the diagram comparing it to the diagrams of our circuits from earlier in the unit. The teacher will ask guiding questions such as- how are the circuits similar? How are they different? Why is this more “green” than the battery powered one?” The smartboard presentation will include a short movie on wind power and the arguments against it and for it. The students will then be divided into two groups and debate the hot topic of the pros and cons of wind power.	At the field trip to the Brooklyn Navy Yard Wind Turbine, the students will get a tour of the facility by one of the turbine mechanics. We will also measure the wind speed as a class and use calculators to determine how much energy is being produced while we are there. The students will ask prerecorded questions and record the responses. The students will also document the experience with class cameras in order to revisit the experience later in the unit.
Materials	Cameras	Diagrams of wind turbines, wind turbines movie (http://www.brainpop.com/science/energy/wind/energy/), A Kid's Guide To Global Warming by Glenn Murphy	Questions for workers, cameras
Differentiation	Expectations will be different depending on students. Some students will be expected to write more than others	Groups will be heterogenously grouped so students will support one another	N/A
Assessment	Teacher will collect pictures of buildings with solar panels with writing component to assess what students understand about solar panels	Teacher will use assessment matrix to document participation in debate and discussion	Teacher will collect all student questions to assess thoughtfulness of questions
Integrated Content Areas	Field trip, Arts, Writing	Science	Field Trip, Science, Technology, Writing

Lesson	Lesson 16: Saving Water	Lesson 17: Wastewater Treatment Plant	Lesson 18: Locally Produced Food and Community Gardens
Description	Students will learn about the natural resource water, why we need to use it sparingly and where their water comes from. Lesson will begin by having the students keep a chart in the classroom about how much water they use. Every time someone goes to the bathroom or get a drink of water they also have to check a box. Chart will also include the average amount of water used in each of these activities. At the end of a day the class can add/multiply to see how much water the class used that day. The class will read Magic School Bus at the Waterworks in order to learn about the cycle of the water we use. Students will complete a flow-chart sequencing activity along with reading.	Field trip to the Newtown Creek Wastewater Treatment Plant. The NYC Department of Environmental Protection office of Environmental Education Outreach operates school tours of the facility. The tour would be led by a worker at the plant and the teacher would distribute trip sheets for the students to complete at points during the tour.	Students will use non-fiction books about growing food provided by the teacher to complete research graphic organizers and compile their information on a poster for a presentation. Teacher will lead a lesson about community gardens. Using Google maps, the class will locate community gardens and farmer's markets. The students will create a KWL chart about what we know about these places. As a class read aloud, we will read City Green. After the read aloud, the students will use a computer drawing program to plant their own community garden and complete a chart about community responsibilities for caring for the garden.
Materials	Magic School Bus At The Waterworks by Joanna Cole, water chart including facts: bath-50 gal, shower-2.5 gal a minute, teeth brushing-1 gal, hand washing-1 gal, bathroom 3 gal, and glass of water-8 oz., SmartBoard, water powerpoint	Differentiated field trip sheets	City Green by DyAnne DiSalvo, non fiction just right books including Our Community Garden by Barbara Pollak, Greening the City Streets by Barbara Huff, http://www.clker.com , Google Maps and SmartBoard
Differentiation	Students will work in partners or groups to complete math equations to figure out how much water we used. Students can use a variety of math strategies to solve the problem. Flow chart activity is differentiated by allowing students to choose to write or draw pictures to explain their chart.	Field trip sheets would be differentiated for homogenous partnerships	Groups will be homogenously grouped, research graphic organizers will be differentiated by group
Assessment	Teacher will collect math solutions to assess understanding	Teacher will collect field trip sheets	Teacher will collect research organizers for assessment and will assess each group presentation and poster
Integrated Content Areas	Science, Literacy, Math	Field Trip	Literacy, Writing, Arts, Technology

Lesson	Lesson 19: East New York Farms!	Lesson 21: Judy Moody Band Aids	Lesson 22: Journal Writing
Description	Field trip to East New York Farms in Brooklyn to see where some of their food comes from. During the tour, students will record the types of food they see grown at the farm. Students will circle which foods they see that they eat at home. Students will also have prewritten questions about how they ENY Farms addresses the problem of communicating across several language barriers. The information they record will be used when they need to translate their own posters and awareness bulletins in our class recycling and awareness project.	Similarly to in Judy Moody, students will create their own band aid designs to promote awareness of their chosen environmental issue or practice. This activity will integrate what students have learned about the environmental topics and practices with visual art. In designing their band aids, students will have to come up with an effective way to visually represent their chosen environment-related issue in order to catch viewer's attention and interest.	Students will keep a journal documenting their own behaviors and action. Student will assess how they, on an individual level, effect the environment. Students will come up with several goals which aim at improving their own relationship with the environment. These goals could be related to recycling, resource (energy, water), transportation, etc. Students will explain how working towards their goals will benefit environment.
Materials	Field Trip Notebook	Judy Moody Save the World book, paper with band aid template, markers, colored pencils, construction paper, scissors	Student Journals
Differentiation	N/A	students will be allowed to select the environmental issue/topic of their own choice. Students will be allowed to use materials of their choice to design their own band aid.	students may collaborate with and support a classmate working in partnerships
Assessment	Teacher will collect field trip notebooks	students will be allowed to select the environmental issue/topic of their own choice. Students will be allowed to use materials of their choice to design their own band aid.	The journal entries. (Do students document/collect data describing their interactions with the environment? Are their goals and plans relevant to the data collected?)
Integrated Content Areas	Field Trip, Social Studies	Science Arts	Science, Literacy

Lesson	Lesson 23: Acting Our Problem Solving	Lesson 24: Environmental Tweets	Lesson 25: Persuasive Letters
Description	We will use drama and role play to come up with good ways to approach and address the actions of a person who may be behaving in an environmentally destructive manner. Students will experiment using different approaches and strategies to solve the problem proposed in a specific situation. They will also research view point against recycling in order to understand the other side of the issue so they can better convince someone who might be opposed to recycling programs. As a follow up to the activity, student will do a self reflection of their own feeling and opinions regarding the main issue/topic addressed in the acted out scenario.	We will talk about how social networking sites can be useful and powerful resource to inform a large number of people about an issue. Students will use the social networking service to spread the word about environmental issues and what can/should be done to help. They will come up with their own statements that they feel will encourage and motivate others make changes that benefit the environment.	The class will look at a few examples of already written persuasive letters and examine the components and features of a persuasive letter. Students will choose an issue about which they feel strongly and develop a clear opinion about it. They will include reasons and examples to support their opinion.
Materials	scenario summaries (first few lines of the interaction)	twitter account, example tweets	sample persuasive letters, document camera, chart paper and markers, paper, pencils
Differentiation	this is a whole class (or group) activity in which students are encouraged to help each other out and offer suggestions. Students of differing abilities will receive scenarios accordingly.	Expectations will be different depending on students. Some students will be expected to write more than others	Writing expectations will be different for different students. Writing paper may also be different amongst students.
Assessment	Informally observe acting/ role play scenarios. Do students use accurate information learned earlier in the unit? teacher will also collect the self reflections.	student tweets will be monitored	The persuasive letters. Do students effectively use features and elements of persuasive writing and of letter writing? Do students include accurate and relevant information?
Integrated Content Areas	Science, Literacy, Drama	Science, Social Studies, Technology, Writing, Social Action	Science, Literacy, Social Action

Lesson	Lesson 26: PSA	Lesson 27: Writing to Community Restaurants	Lesson 28: Implementing class/school Recycling Program and Raising Awareness
Description	Together, we will examine several example public service announcements. We will talk about what a public service announcement is, what their purpose is, and which ones are most effective and why. In pairs, students will decide on which environmental issue they would like to focus. They will select appropriate information to include in their PSA which will work effectively to inform and interest their audience as well as inspire a desire to help the cause.	Students will examine and document the current practices of several local restaurants and evaluate how they impact the environment. This will be done through a field trip to the restaurant in interviews with employees. In small groups, students will develop proposals for the restaurants could reduce negative impact on the environment. They will then write formal letters outlining their suggestions as well as their reasoning behind the suggested changes. This activity encourages students to build relationships with members of the community outside of the school in order to effect change in the community.	Students will look at the current practices taking place in the classroom/school and consider how they affect the environment. They will look specifically at how our practices and behaviors in school affect the environmental issues that we studied earlier in the unit. Students will select areas that they wish to target for change. We will brainstorm ways which to change our behaviors in order to reduce negative environmental impact. Students will then come up with ways in which they want to spread the word to other classes and grades as well as maintenance staff. They will need to develop ways to teach their fellow students about the need for such changes as well as "sell" their proposed plans for change in order to motivate others to follow them.
Materials	video camera, computer with video editing program, poster board, markers, glue sticks, craft materials	student journals, envelopes, restaurant's address, stamps	journals, pencils, chart paper and markers, poster board, markers, camera
Differentiation	students will work in small groups so they can support each other. Each group will select their own topic/issue	students will discuss these ideas with teacher as a whole class. Students will write a rough draft that the teacher will look over and make suggestions.	students will be working in groups so they can divide work and share ideas. The groups will also conference with the teacher throughout the project so that the teacher can provide suggestions and guidance.
Assessment	Collect PSAs (Do students select accurate and appropriate information? Do students use visuals, catch phrases, etc. in order to catch the audiences' attention	letters/ proposals to the restaurants. (Do students make accurate observations about the restaurant's current practices, analyze how these practices may be impacting the environment, and make a proposal/plan?	Students' plans of action to implement the recycling program.
Integrated Content Areas	Science, Technology, Writing, Arts, Social Action	Science, Literacy, Social Action	Science, Literacy, Arts

Lesson 1: Local Environmental Issues

Information:

2nd Grade

Whole Class Lesson- 90 minutes

Standards:

Early Childhood Environmental Education Standards

- Guideline 2.1: Authentic Experiences
- Guideline 4.2: Curiosity and Questioning
- Guideline 4.3: Development of Environmental Understandings

Common Core ELA Standards

SL.1.1. Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.

* Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).

* Build on others' talk in conversations by responding to the comments of others through multiple exchanges.

* Ask questions to clear up any confusion about the topics and texts under discussion.

Objectives:

Students will participate in a group discussion to establish their collective knowledge of “going green” and the environment

Students will collaboratively create a KWL chart on the topic “Going Green in Brooklyn”

Materials:

Chart Paper

Markers

Introduction to Lesson:

This lesson will be a full class discussion on the rug to introduce the “Going Green in Brooklyn” Unit. In this lesson students will make a KWL (Know, Want to Know, Learned) chart with their teacher to begin activating their prior

knowledge about the environment and sustainable living practices. This lesson will also introduce the unit-long twitter project in which students will collaborate daily to make a “tweet” about what they have learned. This will be a way for students to reflect and consolidate their daily learning as well as get the word out to their community about the community environment and how to protect it.

Procedure:

- Students will begin by agreeing on rules for their discussion. One student (or a group of students) will serve as moderators and be responsible for calling on other students. Students (or the teacher) may also be responsible for writing student ideas on the KWL chart. The teacher will assist with moderation as needed or as requested by the students.
- Students will begin by brainstorming things they know about or things they do to protect their environment. These things will be listed on the “K” section of the chart
- Students will then add questions to the “W” section about things they would like to know about their environment or environmental living.
- Throughout the unit students can add more to the chart as they learn more and come up with new and different questions. The chart will remain posted in the room to remind students of their focuses in the unit.

Differentiation:

Students moderating the discussion can be selected in a variety of ways, either randomly or based off of strengths. Also students may illustrate their KWL chart to help clarify their thinking. Students who feel less comfortable speaking may also share their ideas with a partner who is more comfortable passing them on the whole class.

Assessment:

Formal Assessment:

- The teacher will assess student thinking shared in the class discussion. She will also note who does and does not participate in the discussion as the oral communication is paramount to this activity.

Informal Assessment:

- Students will be informally assessed based on their active listening and discussion abilities demonstrated during the KWL discussion.

Lesson 6: How Much Do We Throw Away?

Information:

2nd Grade

Whole Class Lesson- 90 minutes

Standards:

Early Childhood Environmental Education Standards

- Guideline 2.1: Authentic Experiences
- Guideline 4.2: Curiosity and Questioning
- Guideline 4.3: Development of Environmental Understandings

Common Core Math Standards

2.MD.9. Generate measurement data by measuring [attributes] of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.

Common Core ELA Standards

W.2.1. Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section

Objectives:

Students will have a physical experience upon which they will reflect in their notebooks about the amount of trash they produce in a day.

Students will measure the amount of trash their class creates every day over the period of the unit.

Students will chart the weight or recycling and trash they produce every day for the course of the unit on a line plot to look at the relationship between the two as they learn more about how and why its important to “reduce, reuse, and recycle.”

Materials:

- Class trash journal
- Student notebooks
- Trash bags
- Class trash bin
- Class recycling bin

- Scale
- Graph paper

Introduction to Lesson:

Students will begin by carrying around a trash bag for a day which they will add to instead of throwing things away. At the end of the day they will reflect on the types of things and the amount of things they threw away in their notebooks. They will think about what was and wasn't surprising about this experience.

Procedure:

- Students will have a full class share of their reflections on carrying around their trash bags for a day and share their feelings about this experience
- Students will be assigned to weigh and record the class trash and recycling bins at the end of every day and to empty these bins into the school dumpster.
- Each day the students will chart these two measurements on a class line chart and will look for changes in the data over time
- At the end of every week students will discuss their findings and if they want to set any weight goals for the next week. They will also tweet about their class findings.

Differentiation:

For the set activity, students can reflect on their experience orally or on video if they are unable to write about it. They may also use technology to reflect on this experience by typing or recording their thoughts.

The rest of the activity requires several student jobs (discussion moderator, recorder, charter, etc..) these can be rotated to help students develop different skills. Students will be heterogeneously partnered in these jobs so that they can collaborate and push each other to develop these skills.

Assessment:

Formal Assessment:

- The teacher will assess student responses to the trash bag carrying assignment. She will look for strong writing skills such as clarity and attention to detail. She will also look for genuine reflection on the relationship between the activity and the unit aim of examining environmental impact.

Informal Assessment:

- Students will be informally assessed based on their active listening and participation throughout the class measuring, charting, discussing, and tweeting activities.

Lesson 13: Solar Energy

Information:

2nd Grade

Whole Class Lesson- 90 minutes

Standards:

Early Childhood Environmental Education Standards

- Guideline 2.1: Authentic Experiences
- Guideline 4.2: Curiosity and Questioning
- Guideline 4.3: Development of Environmental Understandings
- Guideline 5.6: Environmental Sustainability

NYC Scope and Sequence

- Unit 2: Energy-Observe, identify and describe a variety of forms of energy:
Electricity PS 4.1a

Common Core Writing Standards

- W.2.1. Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., *because*, *and*, *also*) to connect opinion and reasons, and provide a concluding statement or section.

Objectives:

Students will learn how to make a circuit.

Students will learn the definitions of an insulator and a conductor.

Students will compare battery powered circuits to solar powered circuits.

Students will decide which type of energy is more green.

Materials:

Battery

Alligator Clips

Light bulb

Light bulb holder

Insulators (such as-paper, cloth, rubber, plastic)

Conductors (paper clip, spoon, silicon)

Recording sheet handouts

Conductor and insulator chart

Circuits PowerPoint

Solar Panels and Battery PowerPoint

Student Journals

SmartBoard and Document Camera

Introduction to Lesson:

This lesson will begin with brief mini-lesson on what is a circuit and how does electricity flow followed by a hands-on exploration of conductors and insulators. The lesson will begin on the rug with a powerpoint on circuits. Students will draw pictures on the SmartBoard to complete the circuit and then define the vocabulary terms as a class. After this powerpoint, the students will experiment with conductors and insulators.

Procedure:

- After mini-lesson on the rug described above, students will be divided into groups and sent to desks to work.
- Students will be in small groups and will receive a light bulb and bulb holder, four alligator clips, a battery and a selection of materials that will serve as the conductors and insulators. Students will also receive a recording chart.
- Students will experiment with each material and record which materials were conductors and which were insulators. The last two spaces on the sheet are blank so students can test two items from the classroom.
- The class will then come together for a whole class discussion and list the insulators and conductors and talk about what they have in common (teacher will use T-chart sheet and allow students to add notes for all to see on the paper under a document camera).
- After this discussion, we will look at pictures and diagrams of solar panels and begin a discussion (questions available on powerpoint slides).
- Our wrap-up discussion will be a discussion about which option is more green.
- This lesson will end with students writing a journal entry about which energy source they think is more green and why- battery powered or solar powered.

Differentiation:

Groups will be heterogeneously arranged so students can help one another. Some students can have the powerpoints printed beforehand and have them in front of them while on the rug. Journal writing expectations will be different for each student.

Assessment:

Formal Assessment:

- The teacher will collect the conductors and insulators sheet and the writing journals to check for understanding.

Informal Assessment:

- While the students are working, the teacher will informally conference with each group to monitor progress. The teacher will also use an informal observation matrix to record participation during group discussions.

Conductors and Insulators

Recording Sheet

If the light bulb lights up with the material as part of the complete circuit, that material is a conductor!

	Conductor?	Insulator?
Silicon Band		
Paper Clip		
Paper		
Spoon		
Soda Can		
Fabric		

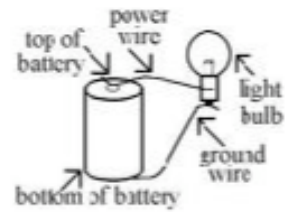
What Materials Made Good Conductors?	What Materials Made Good Insulators?

Circuits PowerPoint

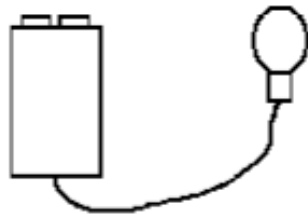
Circuits

- An electric circuit is a path along which current flows
- Current can only flow through a closed circuit, this means that the wires must go in a full loop around from the power source (battery) and back again

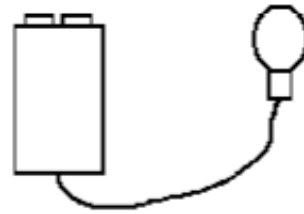
Is this a closed circuit?



Is this a closed circuit?



How could you make it closed?

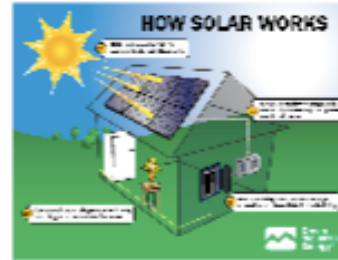


- Battery provides energy in a closed circuit and current transports energy from the battery to the bulb
- Electrical **conductors** are materials that allow electric current to flow through them
- Electrical **insulators** are materials that do not allow electric current to flow through them

Lets Review... Define:

- Closed Circuit
- Insulator
- Conductor

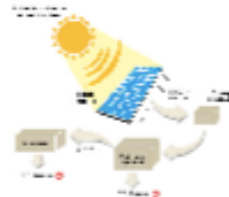
Solar Panel PowerPoints



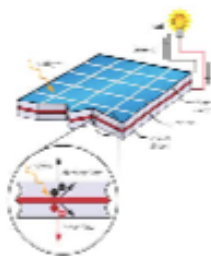
- Solar Panels do not have batteries, what do you think creates the current?



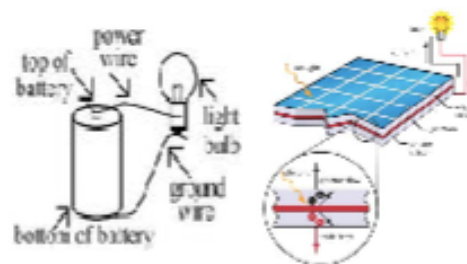
- The sun powers the electrons in silicon to create current
- Was silicon a conductor or insulator?



How is this different from our circuits?



What's Different? What's The Same?



Lesson 17: Saving Water

Information:

2nd Grade

Whole Class Lesson- 50 minutes

End of Day Math Activity-20 minutes

Standards:

Early Childhood Environmental Education Standards

- Guideline 4.3: Development of Environmental Understandings
- Guideline 5.6: Environmental Sustainability

NYC Scope and Sequence (Science)

- Unit 3: Plant Diversity-Describe the basic needs of plants: water LE 1.1b

Common Core Literacy Standards (reading, writing, listening)

- RL.2.3. Describe how characters in a story respond to major events and challenges.
- RL.2.5. Describe the overall structure of a story
- RL.2.7. Use information gained from the illustrations and words in a print or digital text to demonstrate knowledge of its characters, setting or plot
- RI.2.4. Determine the meaning of words and phrases in a text relevant to a *grade 2 topic or subject area*.
- SL.2.2. Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
- W.2.8. Recall information from experiences or gather information from provided sources to answer a question.

Math NYS Standards

- 2.PS.1 Explore, examine, and make observations about a social problem or mathematical situation
- 2.PS.2 Interpret information correctly, identify the problem, and generate possible solutions
- 2.PS.4 Formulate problems and solutions from everyday situations
- 2.PS.5 Use informal counting strategies to find solutions

Objectives:

Students will learn about how much water we use every day.

Students will mathematically solve the problem-how much water do we use a day as a class?

Students will understand how water the city gets its water supply.

Materials:

Water use classroom chart
Water powerpoint
Magic School Bus At The Waterworks by Joanna Cole
Flow Chart cut-outs
Construction paper, markers, scissors

Introduction to Lesson:

This lesson will begin with brief mini-lesson with a powerpoint on the SmartBoard. The powerpoint (seen below after the lesson) shows students how much water we use each and every day. After the powerpoint and a brief class discussion, the teacher will introduce the class water chart. She will explain that every day this week we are going to keep track of how much water we use. In the morning, students can add a tally mark for any baths, showers, teeth brushing, toilet flushes and hand washing they did at home. Throughout the days at school, students will continue to add to the chart as they use water.

Procedure:*Read Aloud:*

- After mini-lesson on the rug described above about water, the students will return to their desks and cut out the flow chart pictures. While they are working the class can brainstorm together what they think some of these names mean (water main, reservoir ect).
- After the students have cut out all of their materials, they will come back to the rug for a read aloud.
- The teacher will model a flow chart on the SmartBoard using handwashing as an example.
- Once the class has reviewed what a flow chart is and all questions are answered, the teacher will explain that the students are going to create a flow chart as she reads. The pieces they have cut out are all places Ms. Frizzle's class visits in this story and they need to arrange them in order and add arrows.
- The teacher will now hand out a marker and piece of construction paper to each student.
- The teacher then begins to read, stopping to clarify vocabulary and ask if anyone has added to their flowchart.
- At the end of the story, the students will go back to their seats and complete their flowcharts.
- Students can add descriptions to the flowcharts or pictures.
- When students have completed their independent work, they will return to the rug and the teacher will ask for volunteers to share their flow charts on the document camera.
- The students will explain their flow charts and the teacher can show the book to make the flow charts more clear.

Math Activity:

- At the end of each day (Monday-Friday) the students will gather at the rug and review how many tallies are in each column. The teacher and students will count the number of tallies in each box and then the students will figure out how many gallons of water were used that day.
- This activity can be done in two ways depending on day or students:
 - One way: Students are divided into 6 homogenous groups and each assigned a category (e.g. bath, shower, hand washing ect) and in their groups they must figure out how much water was wasted that day in that category. All results are recorded on the board and the class adds up the final totals together when all groups finish their sections
 - Second Way: Students divide into partners and add up every area and compare results with other groups to check for accuracy
- When students have finished, the class comes back to the rug to record the results. As a class, they brainstorm ways to conserve water. As the week goes on, the class can see if their totals become less. As new ways to conserve water come up and the class all agrees to make these changes (aka shorter showers or turning off water when we brush our teeth) the number of gallons used per activity can be lessened as well.

Differentiation:

The flow-chart read aloud activity is differentiated by allowing some students to write explanations for each part of the magic school bus' trip, and others can draw pictures to show what happened in each stage of the story.

The math activity is differentiated through homogenous groups in option one. The teacher would assign lower groups to the categories that use less water (hand washing) and high groups to the categories that use more water (bath). If the second option is used, these partnerships can be heterogeneously paired.

Assessment:

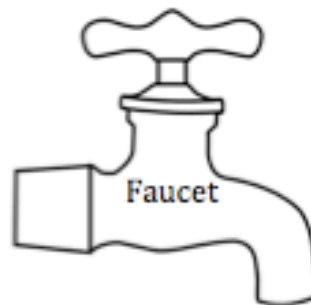
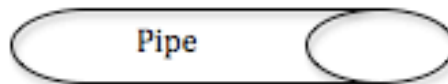
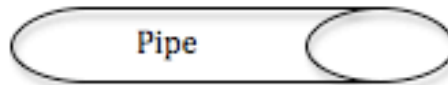
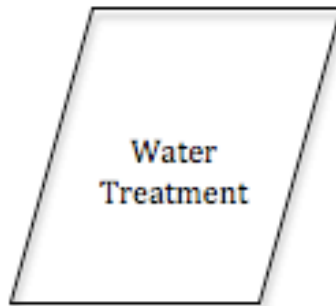
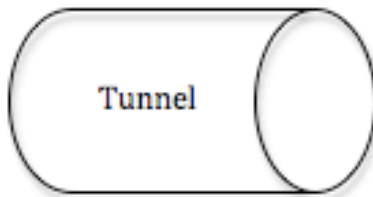
Formal Assessment:

- The teacher will collect the flow charts to assess understanding of the water cycle and the read aloud.
- The teacher will also collect the notebooks students used to figure out how much water was wasted.

Informal Assessment:

- The teacher will informally assess student understanding of both activities through informal observation matrices during both the read aloud discussions and the math activity.

Cut out these shapes and use in a flow chart to show Ms. Frizzle's class' journey at the Waterworks (after cutting out shapes, glue to construction paper and add arrows to your flow chart)



Water PowerPoint

How much water do we use
every day?



1 Gallon of Water



Brushing Your Teeth



Washing Your Hands



Flushing The Toilet



Taking A Shower



Average Shower = 10 minutes



Bath = 50 GALLONS!!



Lesson 20: Band-Aids

Information:

2nd Grade

Whole Class Lesson- 15 minutes

Individual work time- 40 minutes

Standards:

Early Childhood Environmental Education Standards

-4.5 A personal sense of responsibility and caring

New York City Blueprint for the Arts

-Students will connect the visual arts to other disciplines

-Students will use arts to extend their learning beyond the classroom.

New York State Common Core Standards

-Recall information from provided sources to answer a question

Objectives:

Students will use ideas from Judy Moody Saves the World to promote environmental awareness in the school and local community

Students will select which images and/or words to use on their Band-Aids that are relevant to the environmental issue which they select as well as effective in attracting interest and encouraging change.

Materials:

-Judy Moody Saves the World

- Paper with Band-Aid template

-Pencils, colored pencils, markers, scissors

-Chart paper and markers

Introduction to Lesson:

Students will begin by thinking back to the Band-Aid that Judy Moody and her brother designed. There will be a whole class discussion about how the designs related to an environmental issue and which one. Students will discuss the purpose of creating the Band-Aids and the Band-Aid project/contest. Students will share their ideas about what would make a good design and what wouldn't be such a good design. Students will then be creating their own Band-Aid designs.

Procedure:

- Students will come to the meeting area and the class will be asked to recall Judy Moody's Band-Aid design.
- Thinking about her Band-Aid, students will think about how the image she chose to use relates to the environmental topic.
- We will do the same with Judy Moody's brother's bat design.
- Students will then discuss what they think makes a good design and what maybe isn't such a good design. The teacher will record these ideas on a chart paper T-Chart. Students will be asked to consider what the goal of the Band-Aid is and which pictures or words best address that goal.
- Students will go to their tables and work on their own Band-Aid design using a Band-Aid template sheet.

Differentiation:

Students will be allowed to select the environmental topic or issue of their choice so they should be comfortable and knowledgeable. Students will also be permitted to use a variety of different materials to create their Band-Aid so they will be able to use what they feel most capable and comfortable with.

Assessment:

Formal assessment:

The teacher will collect the Band-Aid designs and note whether students designs had a clear relevance to one of the environmental topic/issues learned about earlier in the unit. She will also look to see if students' designs would be effective in catching interest and attention of a viewer.

Informal Assessment:

Students will be assessed based on participation and their input during the class discussion

Lesson 25: Persuasive Letters

Information:

2nd Grade

Whole Class Lesson- 30 minutes

Planning and writing time- 40 minutes

Standards:

Early Childhood Environmental Education Standards

-4.5 A personal sense of responsibility and caring

Common Core Writing Standards

-Students will express opinions (in such forms as oral and written reviews, letters to the editor, essays, or persuasive speeches) about issues, and experiences, supporting their opinions with some evidence

-Students will use effective vocabulary and follow the rules of grammar, usage, spelling, and punctuation in persuasive writing.

-Students will present arguments for certain views or actions with reference to specific criteria that support the argument

Objectives:

Students will develop an opinion regarding an environmental issue previously examined in the unit and provide supporting reasons and examples.

Students will follow the structure of a persuasive letter.

Materials:

-Sample persuasive letter

- Chart paper and markers

- Paper and pencils

- Graphic organizer/ planning page

Introduction to lesson:

This lesson will begin with a whole class review of the various environmental topics we learned about throughout the unit. We will create a chart recording the topics as well as what people could do to improve the problematic situations. The discussion will then turn to looking at the benefits of using persuasive letters to share our opinions with others in a convincing way. We will look a sample letter and point out the main parts of the letter (Date, Dear..., the opinion, supporting reasons and examples, the closing). Students will talk with a partner about their opinion on one of the topics. Students will then have time to independently fill out a planner graphic organizer and write their letters.

Procedure:

- Students will come to the meeting area and we begin our discussion of the environmental topics and problems we studied. The teacher will record topics in a T-chart.
- Students will be asked what types of things people in the community could do to help these problems. These responses will be recorded on the other side of the T-chart (under the “What should be done?” heading)
- Teacher will explain that one way we can get people to try to do the things under the “What should be done?” side of the chart is to write letters to them persuading them to change and using good reasons.
- Students will look at a sample letter and make observations about what they notice. Teacher will fill out a graphic organizer breaking the letter into its parts.
- Teacher will read letter as students follow along. Teacher will stop to point out opinion and reasons.
- Students will talk with a partner to choose a topic and develop their opinion.
- Students will go to their tables and begin filling out the graphic organizer.
- Students will have teacher look over their organizer and begin writing their letters.

Differentiation:

Students may use a partially completed graphic organizer. Also, students may have an individual letter writing guide at their table spot to which they may refer while writing their letter. Students may also include an illustration in their letter in order to clarify and strengthen the presentation of their opinion and ideas.

Assessment:

Formal Assessment:

- The teacher will collect the graphic organizers and letters. She will check to see if students stated a clear opinion and supported it with reasons and/or examples. She will also note whether students followed the letter format.

Informal Assessment

- Students will be informally assessed based on their participation during the whole class discussion portion of the lesson as well as while they are sharing opinions and ideas with a partner.

Name:

Date:

Persuasive Letter Planning Sheet

Dear _____,

My environment problem (what I will talk about):

--

My Opinion (Why is this problem important? What can be done to help?):

--

My first reason/example (why do I think this?):

My second reason/example (why do I think this?):

Sincerely,

(Your name) _____

Differentiation and Extension

As effective educators we must be sure to differentiate instruction throughout an integrated content unit such as this in a way that is aware of the diverse range of learning needs in our classrooms. It is important to bear in mind that those ways noted here are just the beginning and that, as responsive educators, it is our job to know the students in our classroom and be creative and intuitive in finding the most effective ways to support their individual learning. Here are some notes on differentiating instruction that may be particularly helpful throughout this unit:

Behavioral Modifications

- Some students may need additional support or guidance when taking on some of the leadership roles in this unit, particularly those of group moderators. Care must be taken in creating partnerships which will be supportive for all students involved.
- Some students may need explicit direction and monitoring, particularly on the many field trips in this unit. It may be beneficial to give such students an adult whom they can check in with should they feel overwhelmed or need assistance.

Academic Modifications

- Students who struggle with different academic aspects of this unit may require other modifications to make the work developmentally appropriate for them
- Students may need math problems related to the unit modified so that the computation and mathematical reasoning is more accessible
- Students may need additional support in writing. Some student may benefit from illustrating their thoughts and captioning rather than writing more extensively. Some students may use illustration to help guide their reflective writing.
- Students may require visual cues to accompany assignments and make the learning more accessible to a multitude of learning styles.

Modifications for ELL Students

- ELL students may feel more comfortable in partnerships with students who speak their primary language. This may help facilitate their involvement in small group and full class activities
- Students may benefit from visual cues and additional instruction (written or oral) in their primary language to help clarify unit expectations.

Assistive Technology

- Students may write reflections using the computer or a typing machine if they struggle with fine motor or other writing skills

- Students may decide to record contributions and reflections to supplement or substitute for written instruction
- If students are unable to attend community site visits, classmates (or the teacher) can create filmed versions of the experience to share back in the classroom space.

Extensions

- Students can be pushed to write in more advanced expository styles using things such as news articles and text books as mentor texts on how to share information gathered and personal reflections on experiences
- Students can employ technology to continue sharing their learning while developing new skills. Some students may decide to start an environmental blog or to use digital design skills to develop posters or banners to share “Green messages”

Assessment

Assessment is an essential component in effective teaching. It is necessary to evaluate students' understanding and learning frequently and in a variety of manners. It is through assessment that the educator is able to determine what needs to be taught and what students' next steps in their learning process will be. It also serves an important role in figuring out what students did not learn and do not know so that these topics can be addressed or readdressed.

The lessons included in our "Going Green in Brooklyn" integrated content unit incorporate formal as well as informal assessment. Both formal and informal assessments are crucial in implementing and evaluating the successfulness of each lesson. Additionally, the unit includes a variety of types of assessment ranging from graphing to role-play scenarios to class presentations and letter writing. We felt it was necessary to use a diversity of assessment tools in order to give all students a chance to demonstrate their knowledge and understanding of the concepts and information covered in the unit. Different students have different strengths and best display what they know and have learned in assorted ways.

Additionally the unit includes authentic assessment. For example the culminating project, in which students will propose a school (or classroom) recycling program, which they will also implement. This project gives students the opportunity to use all of what they have learned throughout the unit to tackle a real life problem in their own school community. Not only does this type of authentic assessment require students to put their knowledge of environmental issues and solutions to use but also requires them to employ

critical thinking and planning skills in order to promote awareness and convince the school community to buy into their proposal.

Community Resources

Brooklyn Children's Museum

145 Brooklyn Ave, Brooklyn, NY 11213

The mission of Brooklyn Children's Museum is to actively engage children in educational and entertaining experiences through innovation and excellence in exhibitions, programs, and use of its collection. The Museum encourages children to develop an understanding of and respect for themselves, others and the world around them by exploring cultures, the arts, science, and the environment.

The Brooklyn Children's Museum is a great community resource for this unit because not only does it have a number of exhibits relating to sustainability, but it is also a green building that will show our students some of the ways our community is going green. One of the exhibits at the museum is a water conservation station that shows students how much water is used every day. The interactive exhibit provides suggestions of how to reduce your water waste at home and in your community. The museum also has solar panels to generate electricity. On the second floor of the museum, students can manipulate light to hit a solar panel that will then produce electricity to power a spinning toy. The museum is also full of recycled materials including vinyl records, sunflower seeds, bamboo and plastic bottles.



Stillwell Ave-Coney Island Subway

2915 Stillwell Ave # 1, Brooklyn, NY

New York City completed building its first solar-powered train terminal in 2005 at the Stillwell Avenue subway station in Brooklyn. The roof of the train station is covered with solar panels that account 60% of the station's power. This subway station on the D, F, N, and Q train lines has solar panels lining its roof to offset its own energy costs. 2,730 photovoltaic panels were attached to the roof of the subway to provide electricity for the station. The power generated by the station could power 40 houses in New York State for a year.



Brooklyn Navy Yard Wind Turbine

63 Flushing Ave # 300, Brooklyn, NY

The Brooklyn Navy Yard has built six wind turbines to save money on energy costs. Installation of these turbines and solar panels is expected to save \$11,000 a year in energy costs. Urban Oyster runs tours of the yard that highlight the wind turbines. These wind turbines are NYC's first building mounted wind turbines.



Newton Creek Wastewater Treatment Plant

329 Greenpoint Avenue Greenpoint, Brooklyn NY, 11222



The Newton Creek Wastewater Treatment Plant has a visitor's center that runs scheduled tours for guests at the Digester Eggs. This community resource will show students how water circulates in New York City and will also introduce methane gas as an additional energy source. According to the website for the visitor center, "The Visitor Center at Newtown Creek tells the story of New York City's water and wastewater systems. Located at the Newtown Creek Wastewater Treatment Plant (WTP), one of New York City's 14 treatment plants, the Visitor Center features DEP employees who narrate the cycle of water from water supply to distribution, wastewater treatment, and harbor water quality."

East New York Farms

613 New Lots Ave, Brooklyn, NY 11207

The mission of the East New York Farms Project is to organize youth and adults to address food justice in our community by promoting local sustainable agriculture and community-led economic development.

East New York Farms runs a number of farmers' markets, urban farms, community gardens and leads an internship program to educate the local youth. East New York Farms has developed a system that lowers the cost of food at farmers' markets even more. They have created an organization called Community Supported Agriculture (CSA) that allows the customer to "buy a share in the farm and receive weekly packages of fresh produce at discounted prices." Their farms use environmentally friendly agricultural practices.



Parental Involvement

In creating and developing our integrated unit of study, we made sure to include learning opportunities which involve students' families members as well as other people in the community. As educators we understand the importance of including our students' families in what they are learning in the classroom. Not only does this give family members an opportunity to see what their child is learning at school but it also encourages students to take ideas from school and bring them into the home and local community. This deepens students' understanding and broadens their learning. They are able to see how concepts and ideas apply to their lives outside of the school environment. Encouraging parental involvement also reinforces the importance of having family support in students' learning and education.

The following are some of the ways in which parents and family members have been included in the unit:

- Throughout the unit, the class will be making daily tweets to an audience of parents, family members, and other community members about the environmental and sustainability topic and issues about which they are learning.
- Students will interview family members (as well as possibly other older community members) about changes over the years in attitudes toward the environment, environmental practices, and environmentalism.
- Parents will be encouraged to join the class on various fieldtrips during the unit.
- Students will be asked to discuss with their families ways that they can contribute to a more sustainable planet.
- Students will be writing persuasive letters to their families proposing one or more ways that their family could change in order to become a more environmentally- friendly and sustainable family/ household

Hackman's Five Components of Social Justice

While creating an integrated unit of study that addresses a diverse classroom community of students, it is important to ensure that the lessons are guided by Heather Hackman's five components of social justice education. Hackman's five components of social justice education include tools for content mastery, critical analysis, social change, personal reflection and an awareness of multicultural group dynamics. This collection of tools will help students recognize a problem at hand, analyze the issue, implement a change and reflect on their understanding and the effect they can have on their environment. Our unit—Going Green In Brooklyn—incorporates Hackman's approach to social justice in order to show our students how they have the power to make a change. These tools are incorporated throughout our unit.

Heather Hackman's first essential component of a social justice educational approach is content mastery. "Content mastery is a vital aspect of social justice education and consists of three principle spheres: factual information, historical contextualization, and a macro-to-micro content analysis." The students will learn about the several ways we harm our environment including through littering, wasting resources and carbon emissions. This information will be presented in a number of ways and students will be able to gather all of the facts and come to their own conclusion. In lesson twenty-three, acting out problem solving, students will research and compile reasons why people do not want to recycle and why some people do not believe global warming is an issue. By researching both sides of the argument, students will have all of the facts presented to them and will be able to write a response reflecting on both arguments. According to Hackman, "the 'facts' necessary for effective social justice education must represent broad and deep levels of information so that students can not only critically examine

content but also effectively dialogue about it with others.” The problem solving activity in the twenty-third lesson allows students to conceptualize these facts and discuss it openly with their peers. We also address Hackman’s first component of a social justice education in our lesson about how different cultures historically look at our impact on the environment. Hackman’s article says that “a thorough understanding of the historical context of all classroom content is vital for students to construct an analytical lens.” This lesson is included in the first section of our unit so the students understand the historical context before they analyze solutions for today.

Critical thinking and the analysis of the oppression is Hackman’s second component of a social justice education. According to Hackman, critical thinking

requires: (1) focusing on information from multiple, non-dominant perspectives, and seeing those as independently valid and not as an add-on to the dominant, hegemonic one; (2) de-centering students' analytical frame and opening their minds to a broader range of experiences; (3) analyzing the effects of power and oppression; and (4) inquiring into what alternatives exist with respect to the current, dominant view of reality of this issue.

Our unit addresses this component by exploring both sides of the wind energy debate and exploring the sustainable ways to produce energy in the second section of our unit-what is being done. In the fifteenth lesson-wind energy- the students will learn about how wind energy works, why people want wind energy and why people are opposed to wind energy. After learning this information, students will conduct a classroom debate to decide whether or not we should construct a wind turbine in the school yard. By debating the sides of the affirmative and opposition, students will open their mind to a “broader range of experiences” and understanding the “alternatives” that exist. Throughout the second section of our unit of study, students learn of a variety of alternatives to what is being done by the majority of people today to conserve energy and better our environment.

Hackman's third component of a successful social justice education is action and social change. It is important for all teachers to teach their students that they have the power to make a change and stand up for what they believe in. This entire unit is designed for students to understand their power and find their voice. The first two sections of our unit provide students the information they need to understand the need to "go green" and instigate change, but the third and final section of the unit actually gives the students the tools they need to make that change. The final project that involves beginning a community recycling program and raising environmental awareness will prove to students that they can make a difference in their community and greater global environment. According to Hackman,

it is also necessary to intentionally teach these tools because most students in our public and private educational environments are taught to feel disempowered ("I can't change anything; I am just one person"), complacent ("I don't have time to change anything"), or hopeless ("Nothing will ever change anyway").

Through this unit, our students will know that things will change if enough people can stand together to make a difference. Although they are just one person, they will learn that one person with a passion for something can make a change. Hackman also writes that "educators need to disrupt the notion that silence is patriotic and teach students that their rights as citizens in this society carry responsibilities—of participation, voice, and protest—so that this can actually become a society of, by, and for *all* of its citizens." By showing our students how our actions are hurting the environment, through the measuring of class CO₂ emissions in the second lesson, how much do we throw away in lesson six, how long does it take to decompose in lesson eight and measuring water wasted in lesson seventeen, we are teaching students that they have a responsibility to change the way society works. Our final project in the third section of our unit, provides our students the tools to do not only take responsibility but instigate change.

Personal reflection is Heather Hackman's fourth essential component to utilize in a classroom that embraces social justice education. According to Hackman,

commitment to self-reflection and personal interrogation gives educators and students alike a place to enact social change and growth. Having the self as a site for change is a useful way to prevent the feelings of hopelessness and powerlessness that students sometimes encounter when discussing macro-level social issues. In addition, self-reflection can serve as a constant motivator.

Our unit of study asks students to reflect on their experiences and thoughts throughout the unit.

At the start of the unit, students are creating a class Twitter account to "tweet" daily to an audience of friends, family, and community members about the things they are learning about the environment including facts, tips, and general documentation of their "green journey." In other lessons such as lesson four on carbon footprints, lesson fifteen on wind energy and lesson seventeen on saving water ask the students to write self-reflections following the lesson and activity. Lesson twenty-two is all about having the students begin a reflection journal to document their own recycling habits and practices. In these journals students can reflect on their own vision of how they can change attitudes about recycling.

Hackman's final essential component of a social justice education is awareness of multicultural group dynamics. This component requires students to engage in "cross cultural communication" and "dialogue on diversity issues." Most of our lessons incorporate peer-learning and working in partnerships or groups. While this sometimes serves as a function of differentiating instruction, this also encourages our students to work together through differences in opinion or background. Hackman writes that "effective utilization of multicultural group dynamics toward a social justice end can happen only if the class members, and in particular the educator, are aware of these issues as well." In our lesson wrapping up the field trip to the East New York Farms, we discuss the issues relating to communicating a message across language

barriers. This discussion, which will be used to help students send their message to a diverse audience, will also touch on students' language backgrounds and differences. Through consistent group work and whole class discussions, students will understand the multicultural dynamics of our class and greater community. With practice in multiple group experiences, students will learn to create a dialogue with their diverse peers about a common interest or belief.

This unit on sustainability in Brooklyn naturally lends itself to Hackman's five components of a social justice curriculum because we are guiding our students towards making a change in their community. In order to guide the students to reach that end goal, we must provide the tools to get there- and those tools are three of the components of Hackman's social justice education-content mastery, critical analysis and multicultural group dynamics. If the students are going to be successful, they must first be knowledgeable about the content, analyze that information and then work together as a group to create a plan to implement a change. The culmination of our unit embodies Hackman's third component of social justice education- social action, and this would not be possible without self-reflection and the before mentioned content mastery and analysis and understanding of group dynamics. By incorporating Heather Hackman's five components of social justice education, we are empowering our students to stand up for what they believe in and showing them that they can make a difference in society.

Bibliography

Hackman, Heather W. "Five Essential Components for Social Justice Education." *Equity & Excellence in Education* 38.2 (2005): 103-09.

Resources For Part One: Global Warming and Other Environmental Issues

Teachers

<http://www.nytimes.com/schoolbook/2012/04/02/tweet-tweet-go-the-kindergartners/?partner=rss&emc=rss>)

http://www.core77.com/blog/sketchnotes/sketchnotes_101_the_basics_of_visual_note-taking_19678.asp)

<http://hdgc.epp.cmu.edu/teachersguide/teachersguide.htm>

Native Americans and the Environment: Perspectives on the Ecological Indian by Michael E. Harkin

<http://www.china.org.cn/english/environment/224191.htm>

<http://www.greenlivingtips.com/articles/311/1/Waste-decomposition-rates.html>

Students

Global Warming by Seymour Simon

Why are the Ice Caps Melting by Paul Meisel

This is My Planet the Kid's Guide to Global Warming by Jan Thornhill

Reusing and Recycling: Helping the Environment by Charlotte Guillain

Rally for Recycling by Lisa Bullard

Recycling by Buffy Silverman

www.c-s-p.org/Flyers/9781847184290-sample.pdf

www.myfootprint.com

Neighborhood Statistics on Temperature (Resource will vary by location)

Resources For Part Two: What Is Being Done?

Teachers

http://www.eia.gov/kids/energy.cfm?page=solar_home-basics

<http://windeis.anl.gov/guide/basics/index.cfm>

<http://www.slideshare.net/xnpsp5/electrical-conductors-and-insulators>

<http://www.andythelwell.com/blobz/guide.html>

<http://www.brooklynkids.org/>

<http://www.nycsubway.org/perl/stations?210:1042>

<http://www.brooklynnavyyard.org/>

http://www.nyc.gov/html/dep/html/environmental_education/newtown_wwtp.shtml

<http://www.eastnewyorkfarms.org/>

Learning Gardens and Sustainability Education: Bringing Life to Schools and Schools to Life by
Dilafruz Williams and Jonathan Brow

Students

<http://www.brainpop.com/science/energy/solarenergy/preview.weml>

<http://www.brainpop.com/science/energy/windenergy/>

<http://www.brainpop.com/science/weatherandclimate/watercycle/mysteries.swf>

Magic School Bus At The Waterworks by Joanna Cole,

City Green by DyAnne DiSalvo

Our Community Garden by Barbara Pollak

Greening the City Streets by Barbara Huff

<http://www.clker.com>

Solar Power (Energy for Today) by Tea Benduhn

Wind Power (Energy for Today) by Tea Benduhn

Harnessing Power from the Sun (Energy Revolution) by Niki Walker

Generating Wind Power (Energy Revolution) by Niki Walker

Energy from the Sun (Rookie Read-About Science) by Allan Fowler

Energy Island: How one community harnessed the wind and changed their world by Allan Drummond

Wind the World Over by Irene Boland and Vanessa Kellogg

Green Power Solar & Wind Power by Peter Lerangi

Watch Me Grow!: A Down-to-Earth Look at Growing Food in the City by Deborah Hodge and Brian Harris

The Adventures of a Plastic Bottle: A Story About Recycling (Little Green Books) by Alison Inches and Pete Whitehead

DK Readers: Water Everywhere by Jill Atkins

Drip Drop: Water's Journey (At Home With Science) by Eve Swertka, Albert Swertka and Mena Dolobowsky

Resources for Part 3: What We Can Do

Teacher

<http://www.livestrong.com/article/120797-disadvantages-recycling-paper/> (disadvantages of recycling paper)

<http://www.nesc.wvu.edu/subpages/psa.cfm> (National Environmental Services Center PSA's)

<http://www.treehugger.com/green-food/new-ratings-for-sustainability-in-restaurants.html> (sustainability in restaurants)

<http://www.teachervision.fen.com/creative-writing/graphic-organizers/33529.html> (graphic organizers for letter writing)

<http://asiasociety.org/education/resources-schools/professional-learning/use-role-playing-strategies-teach-global-environment> (ideas for teaching environmental sustainability using role play)

The Everything Green Classroom Book by Tessa Hill

Student

<http://www.brainpop.com/science/ourfragileenvironment/humansandtheenvironment/preview.weml> (BrainPOP video about how people can help the environment)

<http://www.nesc.wvu.edu/subpages/psa.cfm> (National Environmental Services Center PSA's)

http://www.scchealth.org/docs/es/docs/recycle/school_programs.html (guide that can be used in planning a school recycling program)

Journey for the Planet: A Kid's Five Week Adventure to Create an Earth-friendly Life by David Gershon

The Everything Kids' Environment Book: Learn how you can help the environment-by getting involved at school, at home, or at play by Sheri Amsel