Reduce, Reuse Recycle: An Interdisciplinary Kindergarten Unit
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I: Summary of Unit

A: Rationale

This unit, titled “Reduce, Reuse, Recycle,” integrates content areas with literacy in an effective and meaningful format for kindergarten students. By focusing on inquiry through hands-on activities, interactive read-alouds, and introductory experiences to technology, primary students are able to begin developing a conceptual and applicable understanding of the importance of the “3R’s.” As this unit focus on applicable, real-life skills, it is doubtlessly a worthwhile topic to include in the kindergarten curriculum. As multiple components of this unit integrate civic engagement, the students are able to apply their knowledge of the “3R’s” to their lives, in order to advocate for themselves, others, animals and the environment.

While this concept is typically not one of the main focuses of the kindergarten science curriculum, an early introduction and reinforcement of conservation skills at such an early age encourages students to lead their lives in an eco-friendly manner. In addition, this lesson encourages students to work beyond the traditional scope of touching on various components of a content area, as students become deeply involved and immersed in the content through the various activities they perform throughout the unit. By fostering inquiry skills and scientific processing skills in kindergarten, these students are prepared for success in various academic endeavors that will implore them to think critically, analyze and synthesize information, and apply newfound knowledge to a variety of situations. In addition, reflecting the Jesuit values of Fairfield University, a socially responsible unit fosters an attitude of working as “men and women for others,” as they learn to think not only of themselves in this unit, but what their individual choices lead to in both short and long term ways.

B: Goals
At the end of this unit, students should…
REDUCE, REUSE, RECYCLE: AN INTERDISCIPLINARY KINDERGARTEN UNIT

a:
- Know that the choices humans and other species in the world make have an impact. In a general sense, the students will know that our actions have consequences for the environment.
- Know that manmade and natural things interact, leading to either proactive or detrimental environmental results.
- Know the difference between each of the “Three R’s,” as well as how they work together.
- Know how to implement the “Three R’s” into their daily life.

b:
- Understand that the decisions we make on a daily basis lead to the conservation or deprivation of the environment.
- Understand that there are alternative resources and methods present to live a more eco-friendly lifestyle, and that many of these are simple to incorporate into our daily lives.
- Regarding literacy, the students will understand that informational texts provide us with real-world information that is often applicable and useful in various ways.
- Understand that scientists experiment, model and pose solutions to the problems and issues they face everyday in their work.

c:
- Begin living there lives in an eco-friendly format, and will be able to educate and instill these values in others.
- Apply their understanding of conservation to their life, their school, and the environment.
- Sift through informational text for details and key information,
- Speak knowledgeably on specific topics
- Become comfortable with working in a collaborative setting.

C: Standards

**CCSS.ELA-Literacy.SL.K.1** Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.

**CCSS.ELA-Literacy.RL.K.4** Ask and answer questions about unknown words in a text.

**CCSS.ELA-Literacy.SL.K.6** Speak audibly and express thoughts, feelings, and ideas clearly.

**CCSS.ELA-Literacy.R.L.K.6** Use words and phrases acquired through conversations, reading and being read to, and responding to texts.

**CCSS.ELA-Literacy.R.I.K.1** With prompting and support, ask and answer questions about key details in a text.

**CCSS.ELA-Literacy.R.I.K.3** With prompting and support, describe the connection between two
individuals, events, ideas, or pieces of information in a text.

**CCSS.ELA-Literacy.RI.K.10** Actively engage in group reading activities with purpose and understanding.

**CCSS.ELA-Literacy.W.K.7** Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them).

**CCSS.ELA-Literacy.W.K.8** With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

NGSS.K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.* [Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]

**NGSS.ESS.C: Human Impacts on Earth Systems**

- Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (K-ESS3-3)

**NGSS.ETS1.B: Developing Possible Solutions**

Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people.

**NGSS.Systems and System Models**

- Systems in the natural and designed world have parts that work together. (K-ESS2-2),(K-ESS3-1)

CT Social Studies Framework K.1.5.9 Discuss how people’s actions affect the environment (e.g. why we recycle or use energy).

CT Social Studies Framework K.3.3.3 Apply appropriate historical, geographic, political, economic and cultural concepts and methods in proposing and evaluating solutions to contemporary problems. - Solve conflicts and classroom issues using appropriate strategies.
D: Pacing
a. This unit is anticipated to require approximately ten hours of science instruction. While the unit is subdivided into ten one-hour sessions over the course of ten days, it can be subdivided into twenty thirty-minute sessions, or even further split by integrating relevant components into the literacy block. As most public schools currently do not allocate a large amount of time to science instruction, the proposed timespan is an ideal, not a requirement. Realistically, such a unit would more likely be broken down into thirty-minute sessions over the course of twenty instructional days, or approximately one month of school.
b. The following timespan and order is recommended for this unit:
Duration: Two weeks with one hour each day of science
i. Days 1-3 (or days 1-6): Reduce
ii. Days 4-6: (or days 7-12) Reuse
iii. Days 6-9 (or days 13-18): Recycle
iv. Day 10 (or days 19-20): Summative Assessment

II: Scope and Sequence

A: Concept Map
In order to make this unit logical and powerful, the unit has been subdivided into three content areas, which each follow a similar progression. Approximately one-third of the unit is allocated to each one of the “3R’s.” Within each of these three-day blocks, each day focuses on either literacy, hands-on scientific activities or social studies via a focus on civic engagement. By focusing specifically on each concept for a specific amount of time, students will not be overwhelmed with information, and will be able to focus on specific skills within each component of the unit. In order to make the unit interdisciplinary and time-efficient, the subdivision of each of the “R’s,” allows the instructor to integrate the unit into literacy and social studies instruction, as the unit also aligns with the Common Core State Standards, Next Generation Science Standards, and Connecticut Social Studies Framework. This format allows the instructor flexibility and multiple opportunities to integrate the unit into any course of study.

B: Daily Outline
Days 1-3: Focus on “Reduce”

Day 1
Objective: Students will begin to understand the significance of reducing, reusing and recycling, specifically focusing on reducing.

Key Terms: reduce, reuse, recycle, “going green,” recycling center
Engage (10 minutes): To introduce students to the “3R’s,” the teacher will engage the students with a relatable read-aloud of *Miss Fox’s Class Goes Green*, by Eileen Spinelli. This narrative incorporates informational content, allowing the students to see the 3R’s in the context of the classroom.

Explain (15 minutes): Following an initial read-aloud, the teacher will go back through the story with students, asking them to identify the things the students and teacher do to reduce, reuse, and recycle. In addition, the teacher will point out some of the things that may or may not be done.

Explore (35 minutes): Following the reading and rereading, the students will be asked to go around the classroom, looking for ways that their classroom reduces, reuses and recycles. Following their search around the classroom, the students will share their discoveries with the instructor as h/she creates an anchor chart for the classroom.

Student’s Tasks/activities:
- The students will first listen to a reading, being encouraged to share any thoughts or opinions about the text.
- During the rereading, the students will answer questions about the text, being prompted to use details and retell.
- Finally, the students will be encouraged to use their newfound knowledge from the text to determine the use of the 3R’s in their classroom

Teacher’s guiding/discussion questions:
- Has anyone ever heard the words reduce, reuse or recycle?
- How do the student’s in Miss Fox’s class reduce/reuse/recycle?
- Do we do any of the things Miss Fox’s class does?
- Do you do anything at home to reduce, reuse or recycle?

Materials:
Book: *Miss Fox’s Class Goes Green*, by Eileen Spinelli
anchor chart paper
markers

Day 2:
Objective: Students will understand the importance of reducing, focusing on energy. The students will create pinwheels to investigate if the wind makes energy.

Key Terms: reduce, renewable energy, wind energy, pinwheel/windmill,
Engage (5 minutes): Use the smartboard to display a “Bill Nye the Science Guy” clip (https://www.youtube.com/watch?v=grI3BDSGEC4) about renewable energy sources. This clip will introduce students to the concept of renewable energy, shifting the day’s focus to how society can reduce.

Explain (5 minutes): Going into deeper detail, the teacher will introduce the text *Young Discoverers-Pollution and Waste (Environmental Facts and Experiments)*, by Rosie Harlow and Sally Morgan. The teacher will read pages 10-12. This will help substantiate the information Bill Nye introduced to the class, as well as segway into the main activity of the day.

Elaborate (50 minutes): Using the art supplies listed below, students will create pinwheels. Upon completion, the class will go outside and investigate whether or not the wind creates energy. (Evaluate) After the investigation, the class will go inside and discuss whether or not society could use the wind to replace other forms of energy.

Homework:
* For Homework, the students will be asked to talk to their parents, family and friends about all the things they have learned about reducing at home and at school. This assignment will activate background knowledge in the students, ensuring that the proceeding day’s formative assessment will be successful.

Student’s Tasks/activities:
- Students will watch the youtube clip.
- Students will participate in a shared reading of pages 10-12.
- Students will create their own pinwheels*
- Students will determine if the wind creates energy, and whether or not this energy is a suitable alternative.

Teacher’s guiding/discussion questions:
- Have you ever been to the gas station with your parents? What makes cars move?
- Is using gas good for the world, people and animals?
- Does the wind make things move?
- Could we use the wind to replace gas?
- How can we reduce how much energy we use?

Materials:
Link to youtube clip: https://www.youtube.com/watch?v=grI3BDSGEC4
*Young Discoverers- Pollution and Waste (Environmental Facts and Experiments)*, by Rosie Harlow and Sally Morgan
Smart Board
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Paper
Pencils
Scissors
Glue
Pins

*: The creation of these pinwheels requires the insertion of a pin into the tip of an eraser, which will be done exclusively by the instructor and a paraprofessional, if available. The students will not receive the pins, and this component of the activity will not pose a safety risk to the students.

Day 3
Objective: Students will explore the school to determine if the school is reducing as much as possible, then propose solutions to any issues they identify. The students will submit a group letter to the principal including their propositions.

Key Terms: reduce, solution

Engage (5 minutes): To get the students excited about the day’s activity, the teacher will begin a conversation about all the ways they have learned to reduce in school and at home. This discussion will activate all schema surrounding the subject.

Evaluate (30 minutes): The students will visit each classroom and see if they are reducing as much as possible. The students will look for things already being done and things that could be done. This activity serves as a formative assessment, as the instructor will determine if the students are observing all the ways classrooms can reduce. The instructor may carry a spreadsheet with them (names and reduction methods), in order to determine how many of the methods the students understand.

Explain (25 minutes): In a Language Experience Activity, which will show the children that their experiences can be written down, the instructor will transcribe a letter for the students about all the ways the school can reduce more effectively. Upon completion, the students will sign the bottom of the letter and deliver it to the principal.

Student’s Tasks/activities:
- Students will participate in a discussion about reducing, referencing the initial read-aloud and all activities they partook in.
- Students will explore the school, looking for all the ways the school does and does not effectively reduce.
- Students will participate in a Language Experience Activity, in order to create a letter to send to the principal.
Teacher’s guiding/discussion questions:
- What are some of the ways we reduce in school and at home?
- Are there ways we can reduce even more?
- What kinds of things do other classrooms do to reduce?
- What ways can the school reduce even more?

Materials:
anchor chart paper
markers
*Miss Fox’s Class Goes Green*, by Eileen Spinelli

Days 4-6: Focus on “Reuse”

**Day 4**

Objective: Students will begin to understand the importance of purchasing reusable materials as well as ways to reuse disposable household materials instead of throwing them away.

**Key Terms:** reuse, disposable, donate

Engage (10 minutes): To introduce students to the concept of reusing, the teacher will engage the students with a relatable read-aloud of *Don’t Throw That Away!* by Little Green Books. This narrative incorporates informational content, allowing the students to see creative ways in which everyday household items can be reused instead of thrown away.

Explain (20 minutes): Following an initial read-aloud, the teacher will go back through the story with students, asking them to identify the things main character creates with reusable material. The teacher will also introduce and discuss the concept of purchasing reusable materials in lieu of disposable materials and why that is beneficial to the environment. Finally, the teacher will discuss the possibility and importance of donating clothing or gently used household items.

Explore (30 minutes): Following the reading and discussion, the teacher will present the students with a variety of everyday household materials, and the students will discuss creative ways in which that item can be reused, whether that item could be donated or sold, and whether it is possible to purchase a reusable version of that disposable item.

**Student’s Tasks/activities:**
- The students will first listen to a reading, being encouraged to share any thoughts or opinions about the text.
During the discussion, the students will answer questions about the text, being prompted to use details and retell. Finally, the students will be encouraged to use their newfound knowledge from the text to determine ways to reuse everyday household items instead of throwing them away.

Teacher’s guiding/discussion questions:
- Do you do anything at home to reuse?
- What disposable items can you replace with a non-disposable version in order to eliminate it from the trash completely?
- Does your family ever donate anything to charity? If so, what sort of items do you donate? In what ways is this beneficial?
- Have you ever had a yard sale, or purchased items from a yard sale? In what ways are yard sales useful?
- Do we reuse anything in this classroom? How can we reuse classroom items so that they don’t have to be thrown away?

Materials:
- Book: *Don’t Throw That Away!*, by Little Green Books
- anchor chart paper
- markers
- everyday household items (plastic bag, brown paper bag, paper, aluminum can, water bottle, clothing, etc.)

**Day 5**

**Objective:** Students will understand the importance of composting as nature’s way of reusing food scraps as a way to help plants grow. Students will be able to identify foods that can and cannot be composted as well as why it is important for neighborhoods and cities to have compost piles.

**Key Terms:** composting, compost pile, earthworm, fertilizer

**Engage** (10 minutes): To introduce students to the concept of composting, the teacher will engage the students with a relatable read-aloud of *Compost Stew*, by Mary McKenna Siddals. This narrative incorporates informational content, allowing the students to see what a compost pile is and what items you can compost.

**Explain** (25 minutes): Following an initial read-aloud, the teacher will go back through the story with students, asking them to identify some of the items that the main character uses in her “compost stew”. The teacher will introduce and explain the process and end result of composting as well as the role that earthworms play in the natural process of breaking down food scraps and turning that into fertilizer for
plants. Finally, the teacher will discuss the benefits of having a compost pile and the steps that would need to be taken in order to make composting in their school as well as at home a reality.

**Explore** (25 minutes): Using the Smart Board, the teacher will display and discuss the information presented on the webpage “Worm Deli: Cooking Up Tasty Meals for Herman and his Friends”, which discusses the foods that can and cannot be eaten by earthworms. Students will then participate in the interactive “Worm Deli” Internet activity provided in which students choose, between two foods presented, which one Herman the earthworm can eat, as well as what size chunks of food earthworms can digest.

**Student’s Tasks/activities:**
- The students will first listen to a reading, being encouraged to share any thoughts or opinions about the text.
- During the discussion, the students will answer questions about the text, being prompted to use details and retell.
- Students will participate in the interactive Internet activity “Worm Deli”

**Teacher’s guiding/discussion questions:**
- Have you ever heard of composting or a compost pile?
- What items go into a compost pile?
- What role do earthworms play in composting?
- Why is composting so important?
- How can we implement a compost pile at school and at home? What are the steps we would need to take?

**Materials:**
- *Compost Stew*, by Mary McKenna Siddals
- Links to webpage: [http://urbanext.illinois.edu/worms/wormdeli/index.html](http://urbanext.illinois.edu/worms/wormdeli/index.html) and [http://urbanext.illinois.edu/worms/wormdeli/wormdeli.html](http://urbanext.illinois.edu/worms/wormdeli/wormdeli.html)
- Smart Board

**Day 6**
**Objective:** Students will investigate the contents of their lunch that remains after they have eaten, and determine what they can do with their remains in lieu of throwing them in the trash. The students will do this by completing a modified version of the worksheet The Three R’s Plus One as a formative assessment.
**Key Terms:** reduce, reuse, recycle, compost

**Engage** (10 minutes): To get the students excited about the day’s activity, the teacher will begin a
conversation about all the ways they have learned to reduce, reuse, recycle, and compost in school and at home. This activity will occur immediately or shortly after the students eat their lunch, and will require that all students to do not throw away anything leftover from their lunch.

Evaluate (35 minutes): The students will individually examine all of the items that are left after they have finished eating their lunch. Each student will complete a worksheet in which they draw each item remaining from their own lunch and indicate whether each item can be reduced, reused, recycled, composted, or must be thrown away. The students will be instructed to notify the teacher when they have completed this step to insure understanding before they continue.

Elaborate (25 minutes): Students will be instructed to individually circle one item from their lunch that they classified as able to be reused. On the back of the worksheet the just completed, students will illustrate a creative way that they would be able to reuse the item that they have selected, making sure to label their drawing to the best of their abilities.

Student’s Tasks/activities:
● Students will participate in a discussion about reusing, referencing the two books that were read aloud and all activities they partook in.
● Students will investigate the remains of their lunch and complete a worksheet, determining whether these remaining items could be reduced, reused, recycled, composted, or must be thrown in the trash.
● Students will illustrate and label a creative way in which they could potentially reuse one of the items that is remaining from their lunch.

Teacher’s guiding/discussion questions:
● What are some of the ways we reuse in school and at home?
● Are there ways we can reuse even more?

Materials:
- all leftover items from each students lunch that day
- modified The Three Rs Plus One worksheet
- pencils and crayons

The Three R’s Plus One

Directions: Draw each item that you have on your desk as a leftover from lunch. Could you reduce, reuse, recycle, or compost it, or must it be thrown away? Place a checkmark in the correct column(s) below. (Don’t forget to include ALL items, such as your lunch box, containers, packaging, and leftover
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food!). Then, circle one item of your choice that you have classified as able to be reused. **Raise your hand when you are finished with this side of the worksheet.**

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**Directions:** In the space below, draw one way that you could reuse the item that you have chosen. **Be creative!!!** Label your drawing and color it in neatly.

Days 7-9: Focus on “Recycle”

**Day 7**

Objective: The students will be introduced the recycling symbol and recycling can, and will learn about the importance of recycling for their environment.

Key Terms: recycling can, recycling symbol, environment

Engage (10 minutes): Before reading, the teacher will show the students the recycling symbol and ask if they have ever seen it before. The students will “turn and talk” with their neighbor discussing the significance of the recycling symbol.

Explain (25 minutes): The teachers will read-aloud “Michael Recycle.” The teacher will ask guiding questions throughout the story in order to understand the importance for recycling for their environment.

Elaborate (25 minutes): After reading the story, will explain why recycling is important for our environment using examples from Michael Recycle and other superheroes in the story. The teacher will show the students the recycling can in the class and explain why we use it and where those particular items go. The teacher will ask a student to put the recycling sign on the wall above the recycling can to
show where the students recycle. The students will go back to their seats and color their own recycling sign to bring home.

Student’s Tasks/Activities:
• Students will identify the importance of recycling.
• Students will comprehend the importance of recycling for their environment.
• Students will learn the significance and usage of the recycling can.
• Students will color their own recycling symbol to enforce recycling in their own homes.

Teacher’s guiding/discussion questions:
• How does recycling protect our environment?
• What does it mean to recycle?
• What do you think are some ways we can recycle in the classroom or at home?
• Why is it important to recycle?
• What is the lesson the author is trying to teach in “Michael Recycle?”
• Why was Michael Recycle considered a superhero?

Materials:
• Large laminated recycling symbol
• Recycling can
• Book: “Michael Recycle” by Ellie Bethel
• Recycling symbol coloring sheets

Day 8
Objective: The students will learn what it means to recycle and what items we recycle.
Key Terms: paper, plastic, recycle, environment

Engage (10 minutes): The students will watch a short YouTube clip about why it is important to recycle and what items are recyclable. [http://www.youtube.com/watch?v=heskCH-YADQ](http://www.youtube.com/watch?v=heskCH-YADQ)
After, the students will “turn and talk” with a neighbor discussing what items we can recycle.

Explore (35 minutes): The teacher will read “Recycle Everyday” by Nancy Elizabeth. The students will listen closely about the different ideas Minna comes up to make her calendar for the Community Recycling Calendar Contest using recyclable items. The students will notice how the illustrations are different made of recyclable paper and other items. After reading, the teacher will ask the students to think about different items that we can and cannot recycle in our classroom. The teacher will make an anchor chart as the students share their ideas. The teacher will write the items and draw a picture so the students can understand. After brainstorming the items, the teacher will put the anchor chart above the recycling can and garbage can so the students know what can and cannot be recycled when they throw
away their trash.

Elaborate (15 minutes): The students will complete a recycling coloring match at their tables. They will need to color all of the items that can be recycled.

Student’s Tasks/Activities:
- The students will watch a YouTube clip and discuss with a partner the different items we can recycle.
- The students will brainstorm and share items that can and cannot be recycled in class.
- The students will complete a recycle coloring match to assess the students’ knowledge about what items can be recycled.

Teacher’s guiding/ discussion questions:
- Why is it important to recycle?
- What is considered recyclable?
- What were different ways Minna and her family recycled?
- What items in the classroom are recyclable and not recyclable?

Materials:
- YouTube clip [http://www.youtube.com/watch?v=heskCH-YADQ](http://www.youtube.com/watch?v=heskCH-YADQ)
- Book: “Recycle Everyday!” by Nancy Elizabeth
- Chart Paper
- Marker
- Recycling color match

**Day 9**
Objective: The students will be able to apply what they have learned about recycling in hands-on activities during science centers.

Key Terms: recycle, environment

*Students will have 15-20 minutes at each center.*

Engage (15 minutes):
1) At this center, students will be allowed to play games on the computer that involve recycling.
- Kung-Fu Trash Master:
2) At this center, students will create their own environmental superhero that encourages looking after the environment, just like Michael Recycle.

Elaborate (15 minutes):
3) At this center, students will use recyclable milk cartoons from school and use them as pots and plants seeds with help from the teacher.

Explain (15 minutes):
4) At this center, students will sort pictures of items that can and cannot be recycled.

Student’s Tasks/Activities:
- Students will plant seeds in recyclable milk cartoons from school.
- Students will create and design their own environmental superhero.
- Students will sort pictures of items that can and cannot be recycled.
- Students will play computer games that require the skill and knowledge of recycling.

Teacher’s guiding/discussion questions:
- What items can be recycled and what items cannot be recycled?
- What can make out of recyclable items found in the classroom?
- Why is it important to recycle for our environment?
- How can we recycle?

Materials:
- Computers
- Recycle computer game links
- Coloring supplies
- Recycled school milk cartoons
- Plant seeds
- Soil
- Pictures of recyclable and non-recyclable items
- Color construction paper
- Scissors
- Superhero cut-outs

Day 10
Objective: The students will be able to use and describe the three R’s in a creative writing activity.

Key Terms: reduce, reuse, recycle
The teacher will ask the students to think about the different ways we can reuse, reduce, and recycle in our world and in our classroom. The students will “turn and talk” with a neighbor to discuss the different ways.

Elaborate (10 minutes):
The teacher and the students will discuss the different ways they can apply the three R’s in the classroom and in the world. The teacher will write down the students’ thoughts and ideas on chart paper.

Evaluate (30 minutes)
The students will complete “My Three R’s Superhero Pledge” encompassing what they have learned in the unit about reducing, reusing, and recycling. This is an independent activity, which will determine what the students’ have learned.

Student’ tasks/activities:
● Students will think about how they can reduce, reuse and recycle in our world and in the classroom.
● Students will share their ideas with the class.
● Students will complete “My Three R’s Superhero Pledge!” independently.

Teacher’s guiding/discussion questions:
● How can we reduce, reuse and recycle in our world?
● How can we reduce, reuse and recycle in our classroom?
● Why is it important to reduce, reuse, and recycle?

Materials:
● Chart paper
● Markers
● “My Three R’s Superhero Pledge!” assessment

III: Formal Lesson Plan

Hands-On Engagement: Exploring Renewable Energy Resources to Conceptualize the Possibilities Associated with Reducing

Lesson Objectives:
Students will…
● Understand that humans use natural resources, and that some uses have detrimental impacts on the environment.
**NGSS. ESS3.C: Human Impacts on Earth Systems**

Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (K-ESS3-3)

- Create pinwheels to explore the possibility of wind energy as an alternative resource.

**NGSS. ETS1.B: Developing Possible Solutions**

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people.
- Partake in a conversation about wind energy and it’s potential as an alternative energy resource.
  - CCSS.ELA-Literacy.SL.K.1 Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.
  - CCSS.ELA-Literacy.SL.K.6 Speak audibly and express thoughts, feelings, and ideas clearly.

**Assessment:**

- The instructor will assess students through the successful creation of a pinwheel.
- The instructor will informally probe students with explicit questioning about energy following the video clip and shared reading.
- The instructor will monitor student participation in the concluding discussion, ensuring that each student is provided an opportunity to share opinions and reactions.

**Key Terms:** reduce, renewable energy, wind energy, pinwheel/windmill

**Materials**

- Bill Nye The Science Guy youtube clip: [https://www.youtube.com/watch?v=grI3BDSGEC4](https://www.youtube.com/watch?v=grI3BDSGEC4)
- *Young Discoverers- Pollution and Waste (Environmental Facts and Experiments)*, by Rosie Harlow and Sally Morgan
- Smart Board
- Paper
- Pencils
- Scissors
- Glue
- Pins
Instructional Activities- One Day Lesson- 60 Minute Science Block

Initiation (10 minutes)
“Engage:” Using the smartboard to display a “Bill Nye the Science Guy Clip,” students will be introduced to the concept of alternative, renewable energy resources, as well as the concept that humans impact the world around them. “Explain:” Next, the instructor will provide more details about this concept through the shared reading of pages 10-12 of the Pollution and Waste informational text. This shared reading will also be a segue to the hands-on activity.

Development (40 minutes)
“Elaborate:” Following a discussion during the shared reading, the instructor will introduce a model pinwheel as one of the mentioned energy resources. The teacher will provide paper, glue and safety scissors to the students and explicitly model how to create the pinwheel. As a safety precaution, the instructor will put the pins inside the pinwheels. Next, the students will go outside with their pinwheels and determine whether or not the wind creates energy.

Closure (10 minutes)
“Evaluate:” The instructor will facilitate a conversation about renewable resources with the students. Depending on the wind that day, the conversation can either reveal the benefits of wind energy, or focus more specifically on one of the challenges of this renewable resource. Each student will participate in the conversation, and the class will come to a consensus regarding the use of wind energy.

Individualized Instruction/ Support for Diverse Learners
- For any ELL students in the classroom, the instructor will introduce and review flashcards with visuals, in order to enhance their comprehension of terms and expressions, such as “windmill/pinwheel,” and “wind energy.”
- For students lacking fine motor skills or for students with sensory issues, the instructor or a paraprofessional may provide further support and assistance during the creating of the pinwheel.

IV: Assessment
A: The teacher will determine if the students have achieved the learning objectives for the unit through different types of assessments, which will measure the mastery of the lesson. There is one summative assessment at the end of the unit, which the students will apply what they have learned throughout the unit. There are two formative assessments that are activities, which will determine if the students understand the material.
B: There are 3 assessments total, 1 summative assessment and 2 formative assessments.
   a) The summative assessment is “My Three R’s Superhero Pledge!” taken from the *Picture Perfect Science* book. The summative assessment will be completed independently on the final day of the unit. In order to master this assessment, students will need to know all the main components of reduce, reuse, and recycle. They will need to know how to use each of these components in our environment.

   b) The are two formative assessments, which will determine the students’ strengths and weaknesses of the material. The first formative assessment is done on day 3, which will determine if the students are observing the different ways the classrooms can reduce. They will visit each classroom and see if they are reducing as much as possible. The students will look for things that are already being reduced and come up with other ways things can be reduced in the classrooms. The second assessment is performed on day 6, which will test their knowledge of reducing, reusing, recycling, and composting. The students will individually examine all of the items left after eating their lunch. Then, they will complete a worksheet, drawing each item and determining whether each items can be reduced, reused, recycled, composted, or thrown away.

   c: Assessment Samples

   **Formative Assessment:**

   **The Three R’s Plus One**

   **Directions:** Draw each item that you have on your desk as a leftover from lunch. Could you reduce, reuse, recycle, or compost it, or must it be thrown away? Place a checkmark in the correct column(s) below. (Don’t forget to include ALL items, such as your lunch box, containers, packaging, and leftover food!). Then, circle one item of your choice that you have classified as able to be reused. **Raise your hand when you are finished with this side of the worksheet.**

<table>
<thead>
<tr>
<th>Item</th>
<th>Reduce</th>
<th>Reuse</th>
<th>Recycle</th>
<th>Compost</th>
<th>Trash</th>
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**Directions:** In the space below, draw one way that you could reuse the item that you have chosen. Be creative!!! Label your drawing and color it in neatly.

Summative Assessment: See attached “Superhero Pledge” activity.

**V: Instructional Differentiation**

There are a variety of ways in which the activities in this unit can be differentiated for students who need more support as well as students who are ready for more of a challenge. In terms of “gearing up” for our formal lesson: Exploring Renewable Energy Resources to Conceptualize the Possibilities Associated with Reducing, the students who complete their pinwheel with ease can be instructed to draw an illustration on each paper strip of their pinwheel depicting the different ways that windmills can be used in the real world to generate and provide energy. In terms of “gearing down” for this lesson, the students who are having trouble manipulating the materials and creating the actual pinwheel can be given a pinwheel in which some of the pieces are already assembled for them, reducing the steps in the process that may cause them to struggle unnecessarily.

In the lesson in which students examine their own lunches to complete the Three R’s Plus One activity sheet, the lesson can be “geared up” for the students who can handle a more independent and tactile activity. These students can be challenged to actually create a new item from one of their leftover lunch items that they had classified on their sheet as able to be reused, creatively utilizing the classroom items available - paper, pencils, crayons, markers, glue, etc. For the students who are struggling and need more support, this lesson can be “geared down” by requiring these students to choose only a few of their leftover lunch items to include in their chart, rather than requiring them to examine all of their leftover items. This will make the workload for these students more manageable and allow for them to accomplish this activity successfully without feeling overwhelmed.

**VI: Resources**

Bethel, Ellie: *Michael Recycle*
http://www.amazon.com/Michael-Recycle-Ellie-Bethel/dp/1600102247

Bill Nye The Science Guy clip
https://www.youtube.com/watch?v=grI3BDSGEC4

https://www.youtube.com/watch?v=grI3BDSGEC4
Harlow, Rosie and Morgan, Sally: *Young Discoverers- Pollution and Waste (Environmental Facts and Experiments)*
http://www.amazon.com/Young-Discoverers-Pollution-Environmental-Experiments/dp/0753455056/ref=pd_sim_sbs_b_1


Little Green Books: *Don’t Throw That Away!*
http://www.amazon.com/Dont-Throw-That-Lift---Flap/dp/1416975179/ref=sr_1_1?s=books&ie=UTF8&qid=1384987210&sr=1-1&keywords=dont+throw+that+away


Morgan, Emily & Ansberry Karen: *Picture-Perfect Science Lessons K-5*

Siddals, Mary M: *Compost Stew*
http://www.amazon.com/Compost-Stew-Mary-McKenna-Siddals/dp/1582463166/ref=sr_1_1?s=books&ie=UTF8&qid=1384987234&sr=1-1&keywords=compost+stew

Spinelli, Eileen: *Miss Fox’s Class Goes Green*


Worm Deli:
http://urbanext.illinois.edu/worms/wormdeli/index.html
http://urbanext.illinois.edu/worms/wormdeli/wormdeli.html