Lesson 1: Imperfect Food Creations 🍌🥛

Driving Question
How can we use food that looks "imperfect" (like overripe bananas or slightly old milk) in creative ways to reduce food waste in our daily lives?

Vocabulary List
- **Food Waste:** Edible food that is thrown away instead of being eaten.
- **Expiration Date:** The last date a food should be eaten for safety or best quality.
- **Imperfect Food:** Food that may look unappealing or be close to expiring but is still safe and useful.
- **Recipe:** A set of instructions for preparing a particular dish.
- **Sustainability:** Using resources in a way that protects the environment for the future.

Modifications for Special Needs (SPED) and Multilingual (ML) Learners
- **For Reading Disabilities/Low Reading Levels:** Provide recipe cards with step-by-step visuals and icons (i.e., banana picture, milk jug, oven symbol, whisk). Use simple, concise language and bold keywords for emphasis. For example, a card might show a picture of a mashed banana next to the word "Mash" and a mixing bowl next to "Mix."
- **For Behavioral Disabilities:** Break the activity into short, manageable steps with clear instructions and time limits for each task (i.e., "Mash bananas for 3 minutes," "Mix ingredients for 5 minutes," "Brainstorm ideas for 7 minutes"). Provide specific roles within groups (i.e., "mixer," "writer," "idea-sharer," "presenter") to ensure all students are actively engaged and accountable, helping to maintain focus.
- **For Multilingual Students (ML):** Provide bilingual recipe cards (English/Spanish or other relevant languages) for key terms and instructions. Encourage students to share food traditions from their home cultures that involve using leftovers or creatively repurposing imperfect food, fostering cultural connections and valuing diverse perspectives.

Co-Teaching Plan
- **Teacher A:** Leads the banana bread demonstration, focusing on the hands-on aspects of mashing/mixing. This teacher can directly model the initial process and engage students in the sensory experience.
- **Teacher B:** Facilitates small group brainstorming sessions about new recipes, provides support with vocabulary and concept clarification, and checks for understanding. This teacher can circulate among groups, offering individualized assistance and ensuring all students contribute to the creative process.
- **Rotation:** Implement a rotation system where groups alternate between participating in the hands-on demo with Teacher A and engaging in idea-sharing and concept development with Teacher B. This ensures every student receives direct instruction and collaborative learning opportunities in both areas.

Relevant NJ Student Learning Standards

- **MS-ESS3-3:** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, considering relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Learning Objectives

Students will be able to:
- Explain why "imperfect" foods can still be safe and useful.
- Describe how reusing food creatively reduces food waste.
- Work collaboratively to design a recipe idea that makes use of "imperfect" food.

Instructional Plan

LAUNCH (Launch) (5 minutes)
- **Bingo sheet**: Have students complete a food waste bingo sheet that features simple habits/hacks to reduce food waste, checking off what they have done. At the end of the lesson, students will be invited to take these home and turn what they have learned into action by completing items they haven't tried.
- **Phenomena-Based Demonstration:** Show students a very ripe, brown-spotted banana alongside a fresh, firm yellow banana. Ask the class, "Which one would you choose to eat right now?" and "Which one might end up in the trash if you found it in your kitchen?" Encourage open discussion.
- **Introduce Concept:** Reveal that the ripe, spotted banana, often considered "imperfect," is actually perfect for making banana bread, smoothies, or pancakes. Introduce the concept of "imperfect food": food that might look unappealing or be close to expiring but is still safe, nutritious, and useful. Discuss how using such food prevents waste. Briefly introduce science behind food waste (how as it rots and decomposes, it produces methane). Show a pie chart of methane emissions generated by food waste.

EXPLORE (Engage & Elaborate) (20 minutes)
- **Hands-on Demo: Banana Bread Batter:**
  1. **Preparation:** Teacher A will have several overripe bananas and several utensils.
  2. **Mashing:** Demonstrate how to easily mash the ripe bananas in a bowl, explaining how the ripening process makes them softer and sweeter, ideal for baking.
  3. **Sensory Experience:** Place a pre-prepared loaf of warm banana bread in the room (baked earlier) so students can experience the smell and, if allowed and safe, a small taste of the finished product.

- **Student Brainstorming: Imperfect Food Recipe Challenge:**
  1. **Group Formation:** Divide students into small groups (3-4 students per group).
  2. **Idea Generation:** Challenge each group to come up with two creative recipe ideas that utilize different types of "imperfect" foods (i.e., brown apples could become applesauce, stale bread could become croutons or French toast, wrinkly carrots could become a soup

or roasted carrots). If struggling, students can ask for help from a volunteer/teacher and can build on an existing recipe idea**.

3. **Visual Representation:** Provide each group with a large poster sheet and markers. Instruct them to sketch or write their recipe ideas, including simple pictures or labels for the ingredients and final dish. Teacher B will circulate, providing guidance, prompting ideas, and ensuring all students contribute.

SUMMARIZE (Explain, Extend, & Evaluate) (15 minutes)
- **Group Sharing:** Have each group share their "Imperfect Food Recipe Challenge" poster with the class, explaining their ideas and the "imperfect" foods they chose to feature.
- **Class Discussion:** Facilitate a whole-class discussion. Ask, "How does creatively reusing imperfect food help families save money, communities conserve resources, and the planet reduce waste?" Guide students to connect their recipe ideas to broader impacts like reducing landfill waste and conserving the resources used to grow and transport food.
- **Teacher Connection:** The teacher will reinforce the connections between individual actions (using imperfect food) and the collective impact on reducing food waste, saving money, and promoting environmental sustainability.

I Can Statements (for K-5)
- I can explain why food that looks imperfect can still be eaten.
- I can come up with new recipe ideas that reuse food instead of wasting it.

Exit Ticket
What is one "imperfect" food you often have at home, and how could you reuse it instead of throwing it away?

**Ideas for recipes:
1. Soft apples → applesauce
2. Old mill → buttermilk pancakes
3. Leftover rice → fried rice
4. Old carrots → carrot cake
5. Extra fruits/vegetables → smoothies/soups
6. Stale bread → croutons
7. Any overripe veggie → pickled vegetables
8. Wrinkly greens (basil, kale, etc.) → herb pesto/sauce
9. Stale cereal/nuts/dried fruit → homemade trail mix
10. Limp zucchini → zucchini fritters
11. Extra grilled chicken → quesadillas/wraps

Lesson 2: Organizing the Fridge to Prevent Food Waste 🥦🥛

Driving Question
How can organizing food in the fridge help us waste less?

Vocabulary List
- **FIFO (First In, First Out):** A method where older food is used before newer food to ensure freshness.
- **Expiration Date:** The last date food is recommended to be eaten for safety or best quality.
- **Storage Zone:** Different parts of the fridge (i.e., crisper drawer, top shelf) designed for optimal storage of specific food types.

Modifications for Special Needs (SPED) and Multilingual (ML) Learners
- **For Reading Disabilities/Low Reading Levels:** Provide large, color-coded fridge cutouts (i.e., green for vegetables, blue for dairy, yellow for leftovers). Include clear visual arrows showing "oldest first" and simple symbols indicating proper shelf placement for different food groups.
- **For Behavioral Disabilities:** Break the sorting activity into small, sequential steps with clear visual cues (i.e., "Step 1: Look at the expiration date," "Step 2: Place older food here," "Step 3: Place newer food here"). Allow for movement by having students physically place the laminated fridge cutouts onto a large poster board or magnetic "fridge" on the wall, providing an active and kinesthetic learning experience.
- **For Multilingual Students (ML):** Use bilingual fridge labels (i.e., "Vegetables/Verduras," "Dairy/Lácteos," "Leftovers/Sobras").

Co-Teaching Plan
- **Teacher A:** Explains the concept of FIFO with real-world examples and demonstrates how to identify and interpret expiration dates on various food items. This teacher will focus on direct instruction and clarifying key vocabulary.
- **Teacher B:** Leads a hands-on fridge organization game using laminated food cutouts, each with a specific expiration date. This teacher will facilitate group interaction, manage materials, and guide students in applying FIFO principles to the activity.

Relevant NJ Student Learning Standards
- **5-ESS3-1:** Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
- **9.4.5.CT.5:** Gather and evaluate information from multiple sources to discuss a solution to a problem. (Fridge organization, where students interpret expiration dates, apply FIFO, and solve the problem of waste.)

Learning Objectives
Students will be able to:
- Explain how organizing the fridge reduces food waste.

- Identify where different types of foods should be stored for optimal freshness.
- Practice FIFO (First In, First Out) by sorting foods by date and appropriate shelf placement.

Instructional Plan

LAUNCH (Launch) (5 minutes)
- **Visual Comparison:** Display side-by-side images: one of a messy, overcrowded refrigerator with food hidden in the back, and another of a neatly organized fridge with clearly visible and labeled items.
- **Questioning:** Ask students, "How many items do you see in the fridge?" Help students realize that because so much food is shoved in the back, it is hard to keep track of what is there. Then ask, "Which fridge do you think is more likely to waste food? Why?" Guide students to consider how forgotten food in the back, or items that are hard to see, are more likely to spoil compared to clearly labeled and rotated food items. This initiates a discussion about the practical challenges of food waste at home.

EXPLORE (Engage & Elaborate) (20 minutes)

Activity: "Fridge Tetris"
1. **Materials:** Provide each group with a set of laminated cutouts of various food items (i.e., milk, yogurt, berries, lettuce, leftovers, cheese), each clearly marked with a different "expiration date" or "best by" date. Each group also receives a large poster board or magnetic "fridge board" with designated sections (i.e., top shelf, middle shelf, crisper drawer).
2. **Organization Challenge:** Instruct groups to organize their food items on their "fridge board" as if they were stocking their own refrigerator. They must apply the FIFO principle by placing older food items (those with earlier expiration dates) in front or on top, and newer food items in the back or below. They also need to consider appropriate storage zones for different food types, such as putting vegetables in the crisper.
3. **Data Recording:** After organizing, groups will record which food types tend to expire fastest based on their cutouts (for example, berries versus a block of cheese). This helps them visualize the urgency of using certain items.
4. **Teacher Support:** Teacher B circulates, observing group strategies, asking probing questions ("Why did you put this here?"), and providing guidance on optimal storage practices.

SUMMARIZE (Explain, Extend, & Evaluate) (15 minutes)
- **Group Presentation:** Each group will present their organized fridge layout, explaining their rationale for food placement and how they applied FIFO.
- **Whole-Class Reflection:** Lead a discussion: "How does organizing food at home help families save money, reduce waste, and ensure everyone has enough to eat?" The teacher will emphasize the connection between individual habits and the broader impact on reducing the amount of food sent to landfills.

I Can Statements (for K-5)
- I can organize food in the fridge to keep it from spoiling.

- I can explain what FIFO means and why it prevents waste.

Exit Ticket

What's one way you could help organize your fridge at home to make sure food gets used instead of wasted?

Lesson 3: Smart Shopping with Lists 🛒📝🥦

Driving Question
How does planning a shopping list carefully help us reduce food waste in our homes and communities?

Vocabulary List
- **Impulse Buy:** An unplanned purchase, often made on the spur of the moment, which can sometimes lead to buying unnecessary items that may go to waste.
- **Shopping List:** A written or digital plan of all the items needed from the grocery store, typically based on a meal plan.
- **Meal Plan:** A schedule or organized strategy of what meals will be eaten for a specific period, used to guide grocery shopping and cooking.

Modifications for Special Needs (SPED) and Multilingual (ML) Learners
- **For Reading Disabilities/Low Reading Levels:** Provide pre-filled shopping list templates with clear visuals (i.e., a picture of a milk carton next to "Milk," a loaf of bread next to "Bread," an apple next to "Apples"). Students can check boxes next to pictures or draw their own visuals for needed items.
- **For Behavioral Disabilities:** Structure the "shopping challenge" activity into short, focused sprints with clear roles for each student (i.e., "List Maker" for drafting items, "Shopper" for envisioning the cart, "Budget Checker" for estimating costs). Use a timer for each segment to keep students engaged and on task.
- **For Multilingual Students (ML):** Provide bilingual shopping list templates, with common grocery items translated. Encourage students to share their favorite household and cultural foods to include in their meal plans and lists, making the activity personally relevant.

Co-Teaching Plan
- **Teacher A:** Explains the concept of impulse buying, illustrating how it can lead to unnecessary purchases and food waste. This teacher will provide examples and engage students in a discussion about mindful shopping.
- **Teacher B:** Runs the interactive shopping challenge activity. This teacher will manage group dynamics, distribute materials, facilitate the creation of shopping lists, and guide students in making realistic choices while adhering to a budget.

Relevant NJ Student Learning Standards
- **MS-ESS3-3:** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. (Focusing on reducing food waste by only buying what is needed as a method to minimize environmental impact).
- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, considering relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. (Defining the problem of food waste from overbuying and designing solutions through meal planning and smart shopping lists).

Learning Objectives

Students will be able to:
- Understand that creating and sticking to a shopping list significantly reduces food waste.
- Create a realistic shopping list that aligns with actual meal needs.
- Explain how impulse buying can contribute to food waste.

Instructional Plan

LAUNCH (Launch) (5 minutes)
- **Visual Comparison:** Display two grocery bags or images of grocery carts: one appears to be filled with random items (i.e., several bags of chips, extra milk, various snacks, one vegetable), and the other is filled with items that clearly suggest a planned meal (i.e., bread, eggs, specific vegetables for a recipe).
- **Engage and Discuss:** Ask students, "Which grocery bag do you think will likely lead to more wasted food? Why?" Guide the discussion towards the idea that unplanned purchases (impulse buys) often result in items that aren't truly needed and might spoil before being used. Introduce the importance of planning for smart shopping.

EXPLORE (Engage & Elaborate) (20 minutes)

Activity: Shopping Challenge
1. **Group Role-Play:** Divide students into small groups. Each group will be tasked with "grocery shopping" for the week, with a budget of around $100.
2. **Meal Planning & List Creation:** Provide groups with simple meal plan templates (including spaces for breakfast, lunch, and dinner for 3-4 days, as well as miscellaneous items for snacks). Students will work together to fill out a basic meal plan and then create a corresponding shopping list based on these meals.
3. **Budget & Impulse Check:** Groups will estimate the costs of their chosen items (using approximate prices provided by the teacher or general knowledge) and actively check their list for any unnecessary "impulse items" they might have subconsciously added. They should aim to stay within their budget and only buy what's needed for their meal plan.
4. **Teacher Support:** Teacher B will circulate among the groups, assisting students in balancing their shopping lists with their meal plans and budget constraints, prompting critical thinking about needs versus wants.

SUMMARIZE (Explain, Extend, & Evaluate) (15 minutes)
- **Presentation:** Each group will present their shopping list to the class, explaining their meal plan and how their list helps them avoid waste and stay within budget.
- **Class Discussion:** Lead a whole-class discussion with questions like, "How does planning meals and shopping lists help families reduce food waste, save money, and contribute to a more sustainable household?".

- **Real-World Connection:** The teacher will emphasize the real-world connection: less wasted food means less money lost for families, fewer resources wasted in production, and less trash ending up in landfills, thus positively impacting the environment.

I Can Statements (for K-5)
- I can explain how shopping lists save food and money.
- I can make a shopping list for a week based on a meal plan.

Exit Ticket

What's one item you will make sure to add (or not add, to avoid an impulse buy) to your family's next shopping list to help reduce food waste?

Lesson 4: Sharing & Donating Food 🥫🍎🤝

Driving Question
How can sharing or donating edible food help reduce waste and support individuals and families in need within our community?

Vocabulary List
- **Food Pantry:** A community-based organization or location where individuals and families experiencing food insecurity can receive free groceries and food items.
- **Share Table:** A designated spot in a cafeteria or school where students can place unopened, uneaten food items or beverages from their lunch that other students may take.
- **Donation:** The act of giving something (like food) to a charity, organization, or person, typically to help others or for a good cause.

Modifications for Special Needs (SPED) and Multilingual (ML) Learners
- **For Reading Disabilities/Low Reading Levels:** Create posters with very clear, concise rules for food donation and sharing, using prominent visual icons or photos (a green checkmark next to "✔ unopened," "✔ packaged," "✔ safe to eat"; a red "X" next to "✘ half-eaten," "✘ spoiled").
- **For Behavioral Disabilities:** Break down the role-play activity into short, defined skits with clear roles (i.e., "Giver," "Receiver," "Pantry Volunteer," "Share Table Monitor"). Provide sentence starters to facilitate participation, such as "I can share this because…" or "This food is safe for the share table because…" to guide interactions.
- **For Multilingual Students (ML):** Provide bilingual vocabulary lists for key terms related to food sharing and donation (i.e., "Donation/Donación," "Share Table/Mesa de Compartir," "Food Pantry/Banco de Alimentos"). Encourage students to share insights into how food donation or sharing practices operate in their own communities or cultures, embracing diverse perspectives.

Co-Teaching Plan
- **Teacher A:** Leads the role-play activity, guiding students through various cafeteria "sharing" scenarios. This teacher will emphasize the practical aspects of deciding what is safe to share and how to respectfully offer/receive food.
- **Teacher B:** Facilitates the poster-making activity for a cafeteria "Food Share Spot." This teacher will support groups in designing clear and effective posters, ensuring that the rules for sharing are easily understood and visually appealing.

Relevant NJ Student Learning Standards
- **MS-ESS3-3:** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. (Focusing on how sharing and donating food reduces waste sent to landfills, thus minimizing environmental impact).
- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, considering relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. (Defining the problem of school food waste and designing practical solutions like share tables or donation systems).

Learning Objectives

Students will be able to:

- Explain how sharing and donating edible food prevents waste and helps others.
- Identify which types of foods are safe to share or donate to a food pantry or share table.
- Design practical solutions to encourage food sharing in a school cafeteria.

Instructional Plan

LAUNCH (Launch) (5 minutes)

- **Story/Scenario:** Begin by telling a short, relatable story: "Imagine a student brings three granola bars for lunch but only eats one. What should they do with the two unopened granola bars?"
- **Brainstorm and Discuss:** Write student answers on the board. Lead a brief discussion that guides students towards the idea of sharing or donating these extra, unopened items instead of throwing them away. Introduce the concepts of share tables and food pantries as solutions.

EXPLORE (Engage & Elaborate) (20 minutes)

Activity: Food Sharing Role-Play

1. **Scenario Cards:** Divide students into small groups and provide each group with scenario cards (i.e., "You have an unopened apple from lunch," "You have a carton of milk you didn't drink," "You have a half-eaten sandwich").
2. **Role-Play:** Students will act out short skits based on their scenarios, demonstrating appropriate actions for sharing food with a friend, placing it on a share table, or identifying if it's suitable for a food pantry.
3. **Class Discussion:** After the role-plays, facilitate a class discussion: "Which foods were safe to share? Which were not? Why?" Emphasize the importance of food safety, particularly for unopened and packaged items.
4. **Brainstorming Rules:** Students will then brainstorm a list of clear rules for establishing a "Cafeteria Food Share Spot" in their school, considering both safety and practicality.

SUMMARIZE (Explain, Extend, & Evaluate) (15 minutes)

- **Poster Design:** Students will work in groups to design visually appealing and informative posters for a hypothetical "Cafeteria Food Share Spot." These posters should clearly display the rules they brainstormed, using both text and pictures/icons to ensure accessibility.
- **Group Presentations:** Each group will present their poster to the class, explaining their rules and design choices.
- **Teacher-Led Reflection:** Lead a whole-class reflection with questions like, "Who benefits when we share or donate food in our school and community? How does this practice help both us and the environment?" Reinforce that sharing reduces waste, helps those experiencing food insecurity, and conserves resources.

I Can Statements (for K-5)

- I can explain why donating and sharing food is important.
- I can identify safe foods to share or donate.

Exit Ticket

Who benefits in our community when we choose to share or donate edible food instead of throwing it away?

Lesson 5: Cafeteria Detectives (Waste Audit) 🍕🥗🕵️

Driving Question
How can we use data to understand cafeteria food waste and come up with solutions to reduce it?

Vocabulary List
- Food Waste Audit: A systematic process of collecting, measuring, and analyzing discarded food to understand its types and quantities.
- Source Reduction: Strategies that aim to prevent waste from being created in the first place (i.e., taking less food).
- Compost: Decomposed organic material (like food scraps) used as fertilizer.
- Baseline Data: Initial measurements or observations that serve as a point of comparison for future data.
- Observation: The act of carefully watching and noting something.

Modifications for Special Needs (SPED) and Multilingual (ML) Learners
- **For Reading Disabilities/Low Reading Levels:** Use simple charts with icons (🍎 for fruit, 🥛 for milk). Provide bar graphs with visuals instead of numbers only.
- **For Behavioral Disabilities:** Use the basketball game as an energizer with clear roles (Shooter, Sorter, Scorekeeper). Keep transitions structured (game → mini-lesson → analysis).
- **For Multilingual Learners (ML):** Offer bilingual word banks (Compost, Share, Trash). During basketball, allow students to say food names in their home language before labeling in English.

Co-Teaching Plan
Teacher A: Leads composting mini-lesson and Food Waste Basketball.
Teacher B: Facilitates the data analysis, helping students interpret sample audit charts and graphs.

Relevant NJ Student Learning Standards
- **MP.4**: Model with mathematics. (Students use tally marks, charts, and graphs to represent food waste data from the mock audit.)
- **NJSLSA.R.7**: Integrate and evaluate content presented in diverse media and formats. (Students interpret visuals (photos of waste, mock audit charts), quantitative data (numbers of wasted items), and apply reasoning to propose solutions.)

Learning Objectives
Students will be able to:
- Sort foods into categories (compost, donate/share, trash).
- Explain how a food waste audit works.
- Analyze data to identify patterns.
- Suggest solutions for reducing common types of food waste.

Instructional Plan
LAUNCH (12 minutes)

Mini Compost Lesson (3–5 min)
- Show examples/pictures: banana peel, apple core, pizza crust. Ask: "Can we eat this anymore?", "Does it still have value?" to introduce the idea that food can still be used even if it's not being eaten.
- Introduce composting: "Compost is nature's way of recycling food scraps. Instead of throwing food in the trash, we let it break down into soil that helps new plants grow."
- Define the categories used in the upcoming sorting game:
  - **Compost** = Natural food scraps (fruits, veggies, bread, pizza crust, rice, etc.)
  - **Donate/Share** = Unopened food that's still safe to eat (milk carton, sealed yogurt, wrapped sandwich).
  - **Trash/Landfill** = Non-food items or food that can't be reused or composted (chip bag, napkin, plastic wrapper).

Food Waste Basketball (7 min)
- **Setup:** Have 3 bins, Compost, Donate/Share, Trash/Landfill, with 2-3 piles of cards, depending on how many students there are. Divide students into 2-3 groups and have them line up in their groups.
- **Game:** The game will be played in a relay format, until 5 minutes are up. The first student in each line takes a laminated food card with an example of a food-related item (apple core, unopened yogurt, sandwich crust, banana peel, unopened milk, napkin, chip bag). They decide where it belongs, then shoot a ball into the corresponding bin, and go to the back of the line. Both teachers will help keep score for each team.
- Tally correct results as a class and discuss:"Why did you choose to put [food item] there?"

EXPLORE (20 minutes)
How a Waste Audit Works (5 min)
- Show visuals of a real food waste audit: trays, bins, tally sheets.
- Explain: "A waste audit means sorting and counting cafeteria waste so we can see exactly what gets thrown away."

Activity: Food Waste Audit (15 min)
- Give students a mock dataset of various food items with numbers next to them.
- **Analysis:** In groups:
  - Graph the data (bar chart or pictogram).
  - Identify the most and least wasted foods.
  - Discuss reasons for waste.

SUMMARIZE (15 minutes)

Whole-Class Discussion
- Have each group share their findings and why they think certain foods were wasted more.

- **Connect to last week's lesson:** Facilitate discussion around what could be done to reduce the waste – too much unopened milk can be mitigated by having a share table or opt-out option, or fruit scraps can be placed in a compost bin. Also circle back to the very first lesson, and challenge students to think about what they could use the unopened food for (if they don't eat their apples during lunch, maybe take it home and make applesauce).

I Can Statements (K–5)
I can sort food waste into compost, share, or trash.
I can read and make a graph about food waste.

Exit Ticket: Starting a Food Waste Audit
If you wanted to start a food waste audit at our school, what is the first step you would take and why?

Lesson 6: Food Packaging & Storage 🥒🥪📦

Driving Question
How do different methods of packaging and storing food help us keep it fresh longer and reduce the amount of food we waste at home?

Vocabulary List
- **Packaging:** Materials used to wrap or protect goods, especially food.
- **Storage:** The action or method of storing something for future use.
- **Perishable:** Food items that are likely to spoil or decay quickly if not kept cool or preserved.
- **Airtight:** Sealed so that air cannot get in or out, which helps prevent spoilage.
- **Cross-Contamination:** The transfer of harmful bacteria from one food to another, often via surfaces or utensils.

Modifications for Special Needs (SPED) and Multilingual (ML) Learners
- **For Reading Disabilities/Low Reading Levels:** Provide observation sheets with large, clear images of each storage method and visual scales (i.e., sad face to happy face for freshness, brown color swatch for browning). Use simple descriptive words for observations (i.e., "wet," "dry," "soft," "crunchy").
- **For Behavioral Disabilities:** Assign specific, rotating tasks during the experiment (i.e., "Timer," "Labeler," "Observer 1," "Observer 2"). Use a visual timer for each observation period. Emphasize the importance of careful, gentle handling of the samples and recording observations accurately.
- **For Multilingual Students (ML):** Provide bilingual labels for the storage methods and key observation terms. Encourage students to describe their observations in their native language first, then translate or use visual cues to record in English.

Co-Teaching Plan
Teacher A: Leads the scientific explanation of food spoilage (oxidation, moisture loss, bacterial growth) and connects these processes to different packaging methods. This teacher will oversee the setup of the experiment and guide students in making predictions.

Teacher B: Manages the hands-on experiment, ensuring all groups properly set up their apple slice samples, conduct observations accurately, and record their data. This teacher will facilitate group discussions during the observation periods and assist with material distribution.

Relevant NJ Student Learning Standards
- **MS-LS1-5:** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. (Relates to how storage conditions—an environmental factor—influence the growth of microorganisms or oxidative processes that spoil food).
- **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (Students evaluate different storage solutions based on their effectiveness in keeping food fresh).

- **5.PS1.A.2:** Measure and graph quantities such as weight or volume to address scientific questions through experimental design. (Students will record observations over time, which can be seen as qualitative data collection in an experimental context).
- **NJSLSA.W.8:** Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism. (Students will gather information through direct observation and record it).

Learning Objectives

Students will be able to:
- Explain how proper food packaging and storage extend the freshness of food.
- Design and conduct a simple experiment to test the effectiveness of different storage methods.
- Analyze experimental data to make informed decisions about how to store food at home.

Instructional Plan

LAUNCH (Launch) (5 minutes)
- **Visual Mystery:** Display a few items: a fresh, crisp cucumber, a soft, wrinkly cucumber; a moldy piece of bread, a fresh piece of bread in its original packaging. Ask students, "What happened to these foods? Why do some foods stay fresh longer than others?"
- **Introduce the Challenge:** Explain that food spoils due to exposure to air, moisture loss, and tiny organisms (bacteria/mold). Introduce the idea that packaging and storage are our tools to fight these processes. Show an image of various food storage containers and methods.
`
EXPLORE (Engage & Elaborate) (20 minutes)

Activity: Apple Slice Storage Experiment
- **Materials:** Fresh apple slices (pre-cut to ensure uniformity and minimize prep time), four different storage methods per group (aluminum foil, plastic wrap, a reusable airtight container, left uncovered on a plate), timers, observation sheets (with space for predictions, a 0–5 browning scale: 0 = no browning, 5 = severe browning, and texture notes like "crisp," "soft," "mushy"), wipes, disposable gloves.
- **Safety:** Emphasize food handling hygiene (wash hands, use clean surfaces). Clearly state that students will not eat the apple slices used in the experiment due to their exposure and experimental nature.
- **Setup & Predictions:** Divide students into groups. Each group receives four apple slices. They place one slice in each of the four designated storage methods. Before beginning, each group predicts which method will keep the apple freshest and which will result in the quickest spoilage, noting their reasons on their observation sheets.
- **Observation Rounds:** Students will conduct observations at specific intervals (i.e., 5 minutes, 15 minutes, 30 minutes, or even later in the day/next day if feasible, depending on time). At each interval, they carefully examine each apple slice, rate its browning, and describe its texture, recording their observations on their sheets.
- **Teacher Support:** Teacher B will circulate, guiding students in making objective observations, ensuring accurate recording, and prompting discussion about what they are seeing (i.e., "What

changes do you notice in the uncovered apple? How is it different from the one in the airtight container?").

SUMMARIZE (Explain, Extend, & Evaluate) (15 minutes)
- **Data Analysis & Conclusion:** Bring the class together. Each group shares their observations and conclusions. Compile class data on a large chart. Discuss: "Which storage method was most effective in keeping the apple slices fresh? Which was least effective? Why do you think this happened?" Connect their observations to the scientific principles introduced earlier (i.e., how plastic wrap limits air exposure, how an airtight container seals in moisture).
- **Real-World Application:** Lead a discussion on how these findings can be applied at home. "Based on what we learned, how should we store leftover cut fruit or vegetables? What about bread or cookies?" Show visuals of correctly stored food items in a refrigerator or pantry.
- The teacher will emphasize that choosing the right packaging and storage method not only keeps food fresh but also saves money by preventing spoilage and reduces the amount of edible food that ends up in the trash.

I Can Statements (for K-5)
- I can explain how to store food to keep it fresh longer.
- I can test different ways to package food and tell which way works best.

Exit Ticket
Name two different food items you have at home and describe the best way to store each one to keep it fresh.

Lesson 7: Waste: Student Action Plans 🌍🗳️💡

Driving Question
How can we, as students, design and implement practical action plans to reduce food waste in our school or local community and inspire others to join us?

Vocabulary List
- **Action Plan:** A detailed strategy or blueprint outlining steps to achieve a specific goal.
- **Community Engagement:** Involving members of the local community in a project or initiative.
- **Feasibility:** The extent to which a plan or project is practical and can be successfully achieved.
- **Impact:** The effect or influence of something, often measured in terms of positive change.
- **Advocacy:** Public support for or recommendation of a particular cause or policy.

Modifications for Special Needs (SPED) and Multilingual (ML) Learners
- For Reading Disabilities/Low Reading Levels: Provide action plan templates with sentence starters for each section (i.e., "Our goal is to...", "First, we will...", "We need to talk to..."). Use large font, clear headings, and allow for drawings or symbols to represent ideas alongside text.
- For Behavioral Disabilities: Assign very specific, measurable tasks within group work, with frequent check-ins and positive reinforcement. Provide visual schedules for the planning process. Ensure each student has a distinct and valued role in the presentation (i.e., "Idea Presenter," "Materials Lister," "Timeline Explainer").
- For Multilingual Students (ML): Allow students to brainstorm and plan in their native language if preferred, then work with a peer or teacher to translate key points to English for the poster. Provide a word bank of relevant vocabulary (i.e., "compost," "donate," "share," "educate," "reduce").

Co-Teaching Plan
Teacher A: Presents the inspirational success stories and leads the initial brainstorming, ensuring all students contribute ideas. This teacher will help groups refine their goals and connect their plans to real-world impact and sustainability concepts.
Teacher B: Circulates among groups during the action plan design phase, providing individualized coaching, ensuring plans are realistic and detailed, and assisting with materials and presentation preparation. This teacher will also facilitate the "pitch" presentations and peer voting.

Relevant NJ Student Learning Standards
- **MS-ESS3-3:** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. (Students will design methods—their action plans—to minimize food waste as a human impact on the environment).
- **MS-ETS1-3:** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. (Students will evaluate their own and peers' action plans for effectiveness and feasibility).

- **MS-ETS1-4:** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. (Students design a "process"—their action plan—that can be tested and refined).
- **NJSLSA.SL.5:** Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks. (Students will present their action plans in a "pitch" format).

Learning Objectives

Students will be able to:
- Be inspired by youth-led initiatives and recognize their potential to make a difference in reducing food waste.
- Collaboratively brainstorm and select a feasible and impactful idea for a food waste reduction project.
- Design a detailed action plan, including goals, steps, roles, and a timeline, for a chosen project.
- Present their action plan persuasively and evaluate the plans of their peers.

Instructional Plan

LAUNCH (Launch) (5 minutes)
- Inspirational Stories: Begin by sharing 2-3 short, compelling success stories of youth-led food waste reduction projects (i.e., a school that started a successful share table, students who organized a food drive for imperfect produce, or a class that implemented a composting program). Use engaging visuals or short video clips if available.
- Call to Action: Ask students, "Could we do something like this here in our school or town? What kind of difference could you make?" Discuss key factors for success, such as starting small, defining clear roles, and measuring impact. This inspires students to think about their own potential as "Community Food Heroes."

EXPLORE (Engage & Elaborate) (20 minutes)

Activity: Action Plan Design
- **Brainstorming:**
  - Group Formation: Divide students into small groups (3-4 students per group).
  - Idea Generation: Challenge each team to brainstorm 2–3 different actionable ideas for fighting food waste in their school or local community. Encourage them to draw inspiration from previous lessons (imperfect food, fridge organization, smart shopping, sharing/donating, waste audits). Examples could include: establishing a permanent share table in the cafeteria, organizing a "Leftovers Contest," creating educational posters for the school, or initiating a small-scale composting program. Provide a list of prompts.
- **Plan Design:**
  - Template Use: Provide each group with an "Action Plan Poster" template (pre-printed large paper with sections for each element).

- **Detailed Planning:** Students will select their best idea and work together to fill in the poster sections:
    - Project Name: A title for their initiative.
    - Goal: A specific, measurable objective (i.e., "Reduce cafeteria plate waste by 10% in one month," "Collect 50 lbs of unopened food for the local food pantry").
    - Steps 1–5: A clear sequence of actions needed to achieve the goal (i.e., "Research local food pantries," "Design share table signs," "Present idea to principal").
    - Roles: Assign specific tasks to potential team members (i.e., "Researcher," "Designer," "Communicator," "Project Manager").
    - Materials Needed: List essential resources (i.e., "Poster board," "Compost bin," "Flyers," "Permission slip").
    - Estimated Impact: Quantify the potential benefit (i.e., "save 40 items of food per week," "provide 15 meals to families in need").
- **Teacher Support:** Teacher B circulates, coaching groups on feasibility, helping them refine their plans to be specific and actionable, and ensuring all students contribute meaningfully.

SUMMARIZE (Explain, Extend, & Evaluate) (15 minutes)

Project Pitches
- Presentations: Each team will give a short, 2-minute "pitch" of their action plan, presenting their poster and enthusiastically explaining their project idea, the problem it addresses, and its anticipated impact. Encourage persuasive speaking.
- Peer Feedback & Voting: After all pitches, peers will use voting dots or stickers to vote for their favorite projects based on criteria like "Feasible," "Impactful," "Creative," and "Exciting." The teacher will tally the votes and announce the top ideas.
- Class Discussion & Next Steps: Lead a discussion about the most popular ideas and why they resonated. Discuss the possibility of taking one or two of these plans further, perhaps by presenting them to school administration or community leaders. Reinforce that even if a plan isn't fully implemented, the process of thinking critically and designing solutions is valuable.

I Can Statements (for K-5)
- I can brainstorm and choose a good idea to help reduce food waste in my community.
- I can create a plan with steps to make my idea happen.
- I can present my idea and explain why it is important.

Exit Ticket
What is one thing you learned about fighting food waste that you are most excited to share with your family or friends?